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No. 22

Antibiotics Save Trees in Fight Against Disease

WASHINGTON — Antibiotics are the Forest Service's newest weapon against the blister rust disease which each year kills millions of valuable white pine trees, the U.S. Department of Agriculture has announced.

Some 300,000 Western white pine trees were saved from certain death in 1958 by the use of acti-dione. While the antibiotic proved most effective against the blister rust disease, it did not harm wildlife or fish.

Treatment cost averaged about 4½¢ per tree. Given a chance to mature, the trees saved will sell for as much as \$100 apiece.

On the basis of last year's success, the Forest Service plans to treat one to two million trees infected with blister rust this year in northern Idaho. The antibiotic, mixed with fuel

(Turn to ANTIBIOTIC, page 17)

New Spray Project Against Fire Ant Begins in Arkansas

EL DORADO, ARK.—Aerial spraying has been started in an attempt to eradicate crop-destroying fire ants from about 20,000 acres of Union County soil.

Cost of the program will be about \$57,000. The federal government is furnishing \$40,000, Gov. Orval Faubus allocated \$12,000 from his emergency fund and Union County has put up about \$5,000.

This will be the third straight year that attempts have been made to control the fire ants. Approximately 12,000 acres in the county were sprayed in 1957, and an additional 7,000 acres were treated last year. Agricultural officials thought the ants had been eliminated, but they reappeared again this spring.

Meanwhile, in Houston the government spraying program to control the fire ants was sharply criticized.

Harold S. Peters, research biologist with the National Audubon Society,

(Turn to FIRE ANT, page 20)

Amendment to Illinois Law Opposed by Plant Food Representatives

SPRINGFIELD, ILL.—Members of the fertilizer industry of Illinois have voiced opposition to a proposed amendment (House Bill No. 1355) to the state's fertilizer law. The amendment would require fertilizer blenders to guarantee only the ingredients used in the blend rather than causing them to guarantee grade.

A group of Illinois fertilizer industry representatives attended a hearing in the State House May 26 before the House Agriculture Committee to testify against passing of the amendment. Rep. Clyde Lee (D.), commit-

tee chairman, conducted the hearing.

Zenas H. Beers, Midwest regional director of the National Plant Food Institute, told the group that the proposed legislation would relax the present protection now covering fertilizer users, and would "open the door to misrepresentation, adulteration and fraud."

He explained to the committee that products of the fertilizer industry are presently subject to inspection by state control officials who check contents of the fertilizer bag against the stated grade. The proposed law, he pointed out, "would seriously weaken rather than strengthen the present Illinois fertilizer law by removing a substantial portion of the plant food sold in the state from regulatory control. . . . The safeguards which the Illinois legislature is being asked to relax are the only assurance which the farmers have against economic fraud, misrepresentation and careless operation."

Another witness, Robert G. Fitzgerald, Smith-Douglass Co., Inc., Streator, Ill., said that if the proposed bill is enacted, "the farmer-buyer will have no protection after the fertilizers intended for blending are in the process of weighing and blending."

Further testimony will be heard from members of the Illinois fertilizer industry, it was indicated. The bill has been voted out with favorable recommendation by the agricultural committee, however, and its proponents express confidence that it will be passed in this legislative session.

←(See Editorial)

Idaho Brothers Form New Fertilizer Company

HOMEDALE, IDAHO—John Cook, Jr., manager of the NH Fertilizer Service since 1956, announces that he and his brothers Bob and Charles, and their father, John Cook, Sr., have formed a new fertilizer company to be known as Cooks Crop Boosters.

John Cook, Sr., will serve as president; John Cook, Jr., as manager and Bob Cook as office manager. Office and plant will be at the former alfalfa dehydrator, which was used last year by the Homedale Produce Co. The plant is complete with warehouse and trackage.

The company will handle Phillips 66 NH products. NH Fertilizer Service has been owned by Simplot Soilbuilders for the past two years, and a new manager is expected to be appointed in the near future.

Stored Grain in Texas, New Mexico Being Fumigated for Control of Khapra Beetle

WASHINGTON—Khapra-beetle infestations found this year for the first time in a small area of West Texas and adjacent New Mexico are receiving prompt eradication treatments with fumigants and sprays, the U.S. Department of Agriculture reports.

The destructive stored-grain pest has been found in small but threatening numbers on 17 properties in El Paso, Texas; two in Hudspeth County, Texas; 11 in the adjacent area of New Mexico; and two in nearby Juarez, Mexico. Arrangements have also been made for treating the Mexican infestations. Infested locations range in size from a feeding pen for chickens to a feed-manufacturing plant.

This current effort is the latest development in a continuing cooperative program by USDA's Agricultural Research Service, Texas, New Mexico, Arizona, California and the Republic of Mexico to eradicate the pest.

To fumigate a building, the structure is covered with air-tight tarpaulins. Then, methyl bromide gas is circulated through the building as well as the commodities stored in it. Grounds or areas around infested

buildings are sprayed with malathion. Commercial fumigators and state and federal pest control workers are applying the present treatments. Contracts have been let for fumigating about three million cubic feet of storage space.

Texas has invoked a state quarantine aimed at preventing spread of the beetle. New Mexico has been under a federal khapra beetle quarantine since 1955. All materials from infest-

(Turn to KHAPRA BEETLE, page 21)

Legislative Roadblock?

(Editorial)

By Lawrence A. Long
Croplife Editor

THE FERTILIZER industry has reached adulthood after its long and tortuous development from a scavenger business of 100 years ago to a respected, chemical manufacturing industry of solid worth whose products are widely recognized as being of tremendous benefit to the entire economy.

Along with this growth and responsibility has developed a splendid working arrangement with the state control officials whose duty it is to check and analyze samples of plant food to see that the product is in accord with the guarantees printed on its label.

It is axiomatic that regulatory controls are not needed to curb the action of reputable manufacturers who comprise 90% or more of the industry; but by the same token it is obvious that if these safeguards were relaxed, it would open the door to fast buck artists, irresponsible operators and downright frauds who would certainly attempt to join ranks with the reputable firms to carry out various schemes.

Who would suffer? Two groups: the farmer who could well be gypped, and the overwhelming number of honest fertilizer manufacturers whose reputations would suffer unjustly through practices of the unscrupulous.

The State of Illinois is considering an amendment to its fertilizer law which could well bring about such a situation. We think the passing of such

(Turn to LEGISLATIVE EDITORIAL, page 20)

Vietnam Issued \$80,000 Pesticide Authorization

WASHINGTON—The International Cooperation Administration has issued an agricultural pesticide authorization to Vietnam amounting to \$80,000.

The contracting period ends Oct. 31, 1959, and the terminal delivery date is Dec. 31, 1959.

Greece to Build New Nitrogen Fertilizer Plant

ROME—The Italian firm Ammonia Casale will help build a \$38 million nitrogen fertilizer plant in West Macedonia, Greece. Ammonia Casale and a West German firm, Friedrich Uhde, have signed a construction contract with the Greek Board of Economic Cooperation.

The proposed plant will be one of the largest factories in Greece. It will use local lignite materials to produce 300,000 metric tons of fertilizer annually, a quantity sufficient to meet current Greek agricultural needs.

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More Effects of Gibberellic Noted

ST. PAUL—Two more effects of gibberellic acid on plants have been noted by scientists at the University of Minnesota. They have found that this chemical causes a plant both to take up more phosphorus and to lose water more rapidly.

The findings come from botanists A. J. Linck and T. W. Sudia. In one test, they put bean plant roots in gibberellic acid solutions, added radioactive phosphorus (P-32) and checked plants 28, 52 and 76 hours later with a Geiger counter.

In all cases, plants treated with the chemical had absorbed more phosphorus than non-treated ones. Gibberellic acid also affected the phosphorus distribution; after 76 hours, for example, upper stems of treated plants had four times as much phosphorus as non-treated ones. In new leaves, though, gibberellic acid only doubled the amount of phosphorus.

Another experiment showed that plants treated with the material lost more water than untreated ones.

Just how much these findings may be used in the future is still a question. Mr. Linck and Mr. Sudia say it would take many more tests to tell, whether gibberellic acid can be used to speed up fertilizer use. But both findings give the scientists important clues on what goes on inside the plant.

WACA Sets California Salesman Education Meeting

FRESNO, CAL.—Chemical salesmen can benefit from a new educational campaign which the Western Agricultural Chemicals Assn. (WACA) has proposed as a substitute for licensing of chemical salesmen. WACA has set a meeting for Sept. 10 at the Fresno Fairgrounds, Fresno.

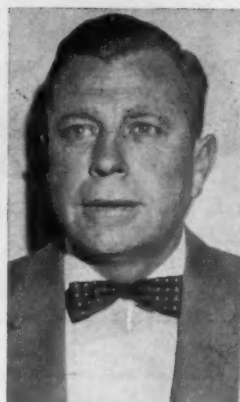
The meetings will be called "A Program to Educate Chemical Salesmen." The remarks of the speakers will be based on pesticide application to specific crops important to the region in which the meetings are held.

At the Fresno meeting, Henry C. Moore has been asked to prepare a paper on "What Salesmen and Farmers Should Know about Aircraft Application of Pesticides." Bob Rollins of the Bureau of Chemistry, a farmer, and three farm advisors will be among others on the program. A question and answer period will be scheduled.

If successful, WACA plans similar efforts in Riverside and in the northern area of the state. They intend to charge a registration fee of \$2 to cover copies of the proceedings.

ALFALFA PUBLICATION

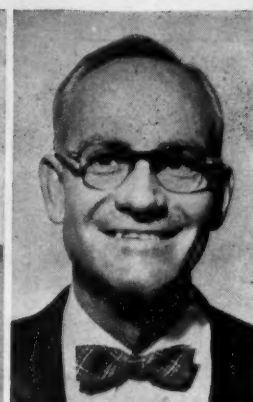
ATHENS, GA.—Use of lime, phosphate, potash and borax is listed as one of the points in efficiency in producing alfalfa in Georgia in a new book called "Alfalfa Production in Georgia."



William R. Van Liere



C. B. Hobbs



Olan R. Glenn

COLLIER APPOINTMENTS—Three appointments have been announced by Collier Carbon & Chemical Corp., manufacturer of Brea Brand fertilizer products. William R. Van Liere has been named staff assistant to manager, agricultural sales development, and C. B. Hobbs has been named staff assistant to manager, agricultural chemical sales. Mr. Van Liere formerly was with Pacific Guano Co., Berkeley, and Mr. Hobbs previously was in industrial chemical sales at Collier. Also announced was the appointment of Olan R. Glenn as southern area manager, agricultural chemical sales. He will headquarter at the company's Santa Ana, Cal., branch office.

Expanding Future Seen For Microbial Insecticides

SACRAMENTO — Dr. Edward Steinhaus, University of California insect pathologist, who with his co-workers first demonstrated the particular abilities of *Bacillus thuringiensis* to control insects, foresees the eventual use for insect control of all disease carrying microorganisms—bacteria, fungi, viruses, protozoa and nematodes.

"There are many of these pathogens," he says. "If we knew about all of them, theoretically we could use microbial insecticides on a very large scale. But even then there would be many situations in which chemicals would be better."

There are certain built-in limitations on the use of living insecticides, according to Dr. Steinhaus. They must be used at specific times in the insect's life cycle and often under specific conditions. Their effect may be delayed from a day to a week or more by the incubation period of the disease carrier. They generally attack only a few insect species and thus might be effective against only one of several pests on the crop. The problems of manufacturing, storing and applying living material are new and complicated.

Benefits of the microbial insecticides, Dr. Steinhaus points out, include:

They are not poisonous to humans; so far they do not seem to develop resistant strains of the host insects; they have ability to attack specific pests without harm to other insects such as bees and ladybird beetles; they can be easily and cheaply produced.

Pests which are susceptible to microbial control include cabbage worms, alfalfa caterpillars, tomato and tobacco hornworms and the corn earworm, California's most important crop pest.

Harris Acquires Kansas City Firm

LINCOLN, NEB.—The acquisition of equipment and facilities of Soil Consultants Bureau, Kansas City testing laboratories, Kansas City, Mo., by Harris Laboratories, Inc., Lincoln, Neb., has been announced.

Lewis F. Harris, president of Harris Laboratories, Inc., stated that the physical equipment of the Kansas City firm was being moved to Harris' Lexington Laboratories Division at Lexington, Neb., where it will be used to expand research and testing facilities. The firm plans to augment research studies in insecticide, herbicide and fungicide field trials, fertilizer formulation and feed additive development for various manufacturers in the agricultural industry.

Grazing Reduces Amount of Nutrients Available for Trees

MADISON, WIS.—Grazing of farm woodlots reduces the amount of soil nutrients available for tree reproduction. This is the conclusion A. L. Leaf and S. A. Wilde, University of Wisconsin soil scientists, drew from research into soil problems caused by woodlot grazing.

The researchers report that grazing depletes topsoil nutrients. From a tree reproduction standpoint this is bad because topsoil serves as a natural seed-bed for new trees.

To check on nutrient loss the researchers collected tree litter from both grazed and ungrazed woodlots. Then they analyzed the litter for nutrient levels to test uptake of soil nutrients by the trees. As a further check, they also analyzed topsoil around the trees.

Plant food levels on grazed plots proved to be lower in both cases.

For instance, litter from grazed plots in the Albany Woods of Southern Wisconsin yielded only about one-half as much calcium and phosphorus as ungrazed plots. Nitrogen checked out about 4 lb. per acre less on grazed plots and potassium was lower by 3 lb.

The soil test showed that grazing lowered available phosphorus in the topsoil by about 20 lb. per acre and exchangeable potassium by almost 140 lb.

The probable reason for plant food loss, say the researchers, is that when woodlots are grazed nutrients are removed in the form of forage and leaching faster than they can be replenished by the subsoil.

Smith-Douglass Reports Sales, Earnings Rise

NORFOLK, VA.—Smith-Douglass Co., Inc., fertilizer and chemical manufacturer, reported net sales of \$35,364,539 for the nine months ended April 30, as compared to \$29,796,452 for the same period last year. Net income increased from \$1,246,773 in 1958 to \$2,431,936 for the current year.

Earnings per common share for the nine months were \$2.36, compared to \$1.24 for the same period last year.

W. Farley Powers, secretary, reported to stockholders that results of third quarter operations, as well as the year through April 30, are in line with the expectations expressed to stockholders during the current year. He noted that fourth quarter operations are customarily at lower profit levels than in any preceding quarter.



ROBERT W. BILLETT (left), Miami, representative of O. E. Linck Co., and J. H. Newcomb, Newcomb Tree Surgeons, new president of the Greater Miami Landscape & Nurserymen's Assn., are shown with some of the weed samples used by Mr. Billett when he appeared as guest speaker at the May meeting of the association.

Speaker Tells Miami Group Advantages of Using Weed Killers

MIAMI, FLA.—Robert W. Billett, Miami representative for O. E. Linck Co., was guest speaker at the May meeting of the Greater Miami Landscape & Nurserymen's Assn. Mr. Billett brought numerous weed samples and used color slides to illustrate his talk on weed control.

He said that mechanical methods such as cutting with hoes, burning and smothering, are being superseded with chemical controls.

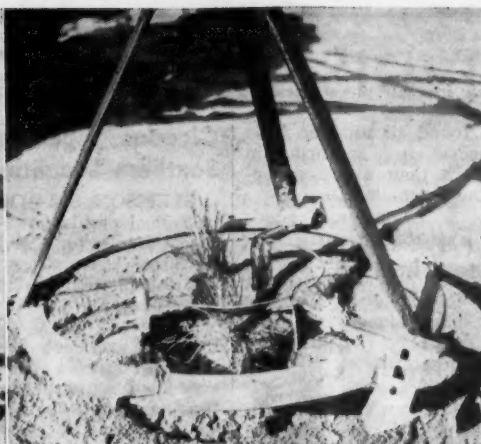
A number of chemicals, both selective and non-selective, were mentioned. The times of application mentioned included pre-planting, pre-emergence, and post-emergence.

Mr. Billett said that in the use of post-emergence selective weed killers, it is most important to follow the manufacturer's directions explicitly. "If the manufacturer specifies two weeks as the killing time, do not

become impatient within two or three days and apply more chemicals," he said. He then used color slides to illustrate the effects of trans-locator killers which work through the plant down to the roots. The evidence does not show up right away with weed killers of this nature, but they are at work. Applying more or less frequently than the manufacturer recommends, or in larger or smaller quantities than recommended, will often damage grass without killing the weeds.

Mr. Billett endorsed the use of detergent wetting agents as means of making contact herbicides more effective. However, he cautioned that the detergents should be specifically tailored for this purpose, because he said that many household detergents are ionic in nature and may set up a reaction which alters the composition of the chemicals.

Mr. Billett also stressed the importance of using accurate methods of application, insuring equal amounts of weed killer over the entire area being treated.



LOUISIANA STATE UNIVERSITY researchers working on the Loblolly pine project are: (left photo, left to right) C. R. Carter, agronomist; R. G. Merrifield, forester, and Dawson Johns, superintendent, Louisiana experiment station, with tractor-mounted circular cultivating tool developed for Loblolly pine seedling fertilizer studies at Homer, La. In the center photo, the cultiva-

tor makes an inner furrow 6 in. radius from the seedling, and an outer furrow 12 in. radius from the seedling. The right photo shows how phosphate was applied in the inner furrow and covered with soil. Nitrogen and potash in the outer furrow will be covered.

LSU Research Workers Start Loblolly Pine Fertilizer Treatments

WASHINGTON—Louisiana State University research workers recently completed initial treatments on 22 acres of Loblolly pine seedlings in new fertilization research projects at the North Hill Farm Experiment Station in Homer, La. Dawson Johns, station superintendent, said that primary objectives of the studies include: (1) determination of levels and combinations of nitrogen, phosphorus and potash that will bring about greatest growth response of Loblolly pine on major north Louisiana coastal plain soils, and (2) attempt to establish a basis for estimating nutritional requirements through soil and plant analysis.

Related fertility studies with Loblolly pine are planned for other areas in the state. Treatments include different levels of N, P₂O₅, and K₂O ranging from 0 to 200 lb. nutrient an acre. Some treatments were applied just before planting, others a few months after planting, and supplemental applications will be made on certain plots in future years.

Soil samples were collected from different depths on each plot for complete chemical analyses. Each plot contains 66 seedlings, and annual measurements will include height, diameter and chemical analyses of foliage and stems. Wood density determinations will be made after the third growing season. Research project workers include Thomas Hansbrough and R. G. Merrifield, research foresters, and C. R. Carter, agronomist.

Michigan Soil Test, Fertility Program Launched; Dealer Meeting Dates Set

CHICAGO—Active support by the Michigan fertilizer industry can help speed the success of the forthcoming Ionia County intensified soil testing and fertility program, reported Fred Peabody, county agent.

The project was launched with a kick-off dinner for county extension leaders, bankers, merchants and civic organization representatives on May 28 in Ionia.

Speakers outlined the program's objectives and its benefits to farmers and the entire community.

The project, sponsored jointly by the Michigan Agricultural Extension Service and the National Plant Food Institute, is designed to get every Ionia County farmer to test his soil, cut costs of production and increase profits in 1959 and the future.

John R. Guttay, district representative of NPFI, is cooperating with Mr. Peabody in setting up the follow-through on the program. NPFI has prepared two color posters and other special educational material including the new Michigan Yield Goal wall charts and check lists to help promote the project. Local newspapers and radio stations have pledged full support.

A number of soil sample depots have already been established and others will be added.

Beginning June 4, a series of monthly dinner meetings is slated for fertilizer dealers and salesmen, Mr. Peabody reports. These sessions will inform salesmen and dealers about the program's progress, seek their advice and suggestions about promo-

tional activities, and help them understand soil test reports and fertilizer recommendations.

At each meeting, Mr. Peabody and his associates will discuss and explain the management practices for crops immediately ahead on the schedule. Top dressing established hay fields is the first project following soil tests. This will be followed by information on management practices for high-yield, high-profit wheat crops; and methods of providing needed nutrients for corn and oats.

Mr. Peabody says the fertilizer industry can help by: (1) Mentioning and supporting the soil test program in their advertising in the county; (2) informing their salesmen and dealers about the program and what it can mean to them, and (3) encouraging salesmen and dealers to attend the monthly industry meetings.

Spencer Reassigns Personnel in Agricultural Division

KANSAS CITY—New assignments involving agricultural chemicals division personnel were announced by Spencer Chemical Co., according to Jack C. Denton, vice president, agricultural chemicals. The reassignments, for purposes of cross-training, will "add considerable breadth to the management capabilities of the individuals," Mr. Denton said in announcing the changes.

Byron M. Kern, general manager of production, will assume the duties of general sales manager. Harold E. Bingham, general sales manager, will take control of the development of new products. Harold Ihde, director of marketing, will assist Mr. Bingham in this effort.

Jack E. Straub, assistant to the vice president, will coordinate production activities in the office of the general manager of production.

Amounts Per Acre, Analysis and Total Amounts of Fertilizer Used with Crops in Georgia—1958

CROP—	Pounds per Acre	Analysis	Acreage	Total tons
Cotton at planting	494	4-12-12	381,000	94,107
Cotton, side dressing	166	24-0-4		31,123
Corn, at planting	360	4-12-12	2,711,000	487,980
Corn, side dressing	145	26-0-0		196,547
Oats at planting*	289	4-12-12	276,000	29,911
Oats, side dressing	129	25-0-0	(207,000)*	13,351
Wheat, at planting	327	4-12-12	71,000	11,608
Wheat, side dressing	138	26-0-0		4,899
Tobacco, at planting	1,277	3-9-9	59,100	37,735
Tobacco, side dressing	260	5-7-12		7,633
Soybeans, at planting	266	4-12-12	90,000	11,970
Cover crops, at planting	304	4-12-12	(303,669)**	11,490
			75,919	
Temporary winter pastures, at planting	424	4-12-12	906,271	192,129
Temporary winter pastures, top dressing	162	28-0-0		73,408
Permanent pastures sown or set, at planting	372	4-12-12	276,217	51,326
Permanent pastures sown or set, top dressing	191	22-3-3		26,378
Peanuts, at planting*	280	4-12-12	515,000	53,935
			(385,250)*	
Peanuts, gypsum	275			
Truck Crops, at planting	972	4-12-12	104,000	50,544
Truck crops, side dressing	237	21-1-3		12,324
TOTAL				1,398,398

*Considered that three fourths of the acreage was fertilized.

**Considered that one fourth of the acreage was fertilized.

GEORGIA HAS made much progress in the use of recommended grades of higher analysis fertilizer such as 4-12-12, according to estimates made by Georgia county agents and compiled by J. R. Johnson, extension agronomist. This is the result of good cooperation of the fertilizer industry and the college of agriculture, says Mr. Johnson. The series of meetings that the agricultural extension service and the Georgia Plant Food Educational Society have held each year has played an important part in the acceptance of recommended grades. The extension agronomy programs are promoting the use of 4-12-12, 6-12-12, 5-10-15 and 6-12-6.

Georgia Soil Fertility Program Credited With Giving Big Increase to Farm Income

ATHENS, GA.—Georgia's Soil Fertility program, operating in 31 counties, continues to grow in magnitude and accomplishment, according to agronomists leading the program for the Agricultural Extension Service, University of Georgia College of Agriculture.

W. A. Sutton, extension director, says, "I know of no activity in my 30 years of extension work that has been more enthusiastically received by Georgia people from all walks of life than has this program."

The program, according to J. R. Johnson, R. L. Wehnt and P. J. Bergeaux, extension agronomists, has had a marked influence on the improvement of fertilizer practices. For example, inadequate use of nitrogen has long limited crop production in Georgia. The Soil Fertility program, however, has shown many farmers that adequate rates of nitrogen, used

in combination with other good cultural practices, pays exceptional dividends.

"Nitrogen consumption has greatly increased as a result of the program," says Dr. Wehnt. Estimated tons of actual nitrogen used for top and side dressing purposes increased from 40,282 in 1956 to 60,265 in 1958—a gain of nearly 50% in three years.

Dr. Wehnt added that the Soil Fertility program meant a savings of approximately two million dollars to Georgia farmers in 1958 as compared to 1956 because they used greater amounts of higher analysis mixed fertilizers and nitrogen materials. This does not include the effect the program has had on increasing crop yields and lowering the unit cost of production which, according to Dr. Wehnt, amounts to several million dollars a year.

INSECT, PLANT DISEASE NOTES

Alfalfa Weevil in Connecticut Crop

NEW HAVEN, CONN.—The alfalfa weevil appears to be well established in Connecticut, according to Richard J. Quinton, entomologist at the Connecticut Agricultural Experiment Station here. It was Dr. Quinton who first discovered the alfalfa weevil in the state.

In a recent bulletin addressed to dairymen and others concerned with production of alfalfa in the state, Dr. Quinton points out that the pest can be controlled with granular insecticides.

Cotton Insects Showing Up in Texas Fields

WACO, TEXAS.—The next few weeks will be crucial ones for cotton growers, according to C. R. Parencia, entomologist with the U.S. Department of Agriculture.

There is an increase of thrips, he said, while boll weevils have also shown up in many fields. Still another insect found in field checking is the fleahopper.

Fleahoppers and thrips are small, early season insects, while the boll weevil starts working somewhat later

and may be found all summer. This year the weevils are appearing in larger numbers than expected, according to the entomologist.

Colorado Expects More Grasshoppers in 1959

DENVER, COLO.—Paul Swisher, state farm commissioner, has predicted that grasshoppers will infest some areas of eastern Colorado this summer.

Earnest A. Lungren, Colorado supervisor of the USDA's plant pest control division, told Mr. Swisher that conditions are favorable for an infestation in parts of Prowers, Baca, Cheyenne and Douglas counties which were not sprayed during last summer's insecticide program.

More than 3 million acres were covered in the 1958 attack on the grasshoppers.

Heavy 'hopper infestations in Arizona and New Mexico have been reported, he said. Also, Wyoming is expected to have trouble this year with hoppers.

Mr. Swisher added, however, that prospects for Colorado's 1959 infestations are not as severe as they were a year ago at this time.

Cicadas Appear in Southern Localities

CLEMSON, S.C.—Outbreaks of the periodical cicada have been reported recently in several sections of South Carolina. Descriptions of the insect and information on its control have been prepared and distributed over the state by W. C. Nettles, leader, Clemson extension insect and plant disease work. He said that the brood scheduled for this year started appearing late in April and would continue to show up in cooler or higher areas throughout May. The adult cicadas live 5 or 6 weeks, his bulletin said.

Cicadas are also being reported from other portions of the South. Northwest Georgia has been infested by the 17-year variety of the insect. Swampy land in that state is said to be besieged by the insects and their clatter may be heard in many areas. Fruit trees were being damaged by the pest in the latter part of May, reports stated.

Thrips Plentiful in Arizona, Report Says

PHOENIX, ARIZ.—Thrips populations in Cochise County were very heavy in the Kansas Settlement, averaging 8 per plant. Populations were very low in the Bowie area. In Greenlee and Graham counties, the infestations averaged about one per plant. This is a light infestation but can be injurious. In Maricopa and Pinal counties some fields continue to show heavy infestations of thrips. The above report was made by Leon Moore, survey entomologist.

Black fleahopper as well as the common fleahopper is destroying minute squares in many fields of Maricopa County. Controls should be started at once and continued at weekly intervals until the injury stops.

A light infestation of cabbage loopers is reported for all parts of the state.

Pink bollworm moths continue to emerge from cages at the Cotton Research Center. Emergence of the moths continues to mean no infestation since cotton is too small to support worms.—J. N. Roney.



Wisconsin Expects Plentiful Pests This Year

MADISON, WIS.—European corn borer survival during the winter of 1958-59 appears to be normal. Survival ranged from 91% in Manitowoc County fields to 25% in a Grant County field. The survival average for the southern and eastern counties was 69%.

Meadow spittlebug "spit" masses are noticeable in alfalfa fields, and insecticides may be profitably used at the present time. In Grant County an average of 1.5 spittlebugs per alfalfa stem was found on May 19. High numbers of spittlebugs were also found in Green, Lafayette, Dane, and Iowa counties.

Pea aphids in 10" peas in Sauk County averaged one aphid per sweep on May 20. Aphids were not found in the other pea fields examined.

Pea aphid counts in alfalfa ranged from 0 to 140+ per sweep. The lower counts were obtained in the northern and southwestern counties, while the higher counts were obtained in the east central and southeastern counties of Washington, Ozaukee and Waukesha.

English grain aphids began to appear in Green, Lafayette, Iowa, and Sauk County oat fields on May 19 and

20. Counts of one aphid per five running feet of oats were observed.

Grasshopper eggs were mostly clear with a few milky in Dunn, Marathon, and Taylor counties. A few nymphs from this year's hatching have been noted, but these are believed to be an early species and are limited primarily to field margins.

Punctures caused by the rhubarb curculio in the stems (petioles) of rhubarb have been present but scarce in some Dane County gardens and asparagus beetles are reported to be abundant in Dane and Sauk County plantings.



No Khapra Beetles Found in Recent Oregon Survey

SALEM, ORE.—The first Khapra beetle survey for this year wound up exactly where the Oregon state department of agriculture hoped it would: not a Khapra beetle in sight. The survey entomologists have concluded their initial search in feed mills, grain warehouses and elevators and other likely locations. All told, 622 grain establishments were inspected, for 67 of which this was the initial search.

Another inspection of the same places will be made this summer. Oregon has conducted Khapra beetle surveys each year since 1954, but none has yet been found.

Survey entomologists often find *Trogoderma parabole*, another species closely related to the Khapra beetle, in feed mills in eastern Oregon. Beetles most commonly found in western Oregon mills are the variegated carpet beetle.

During the Khapra beetle surveys the lesser grain borer was found in Tillamook County for the first time in Oregon. In 1957 and 1958 it was found in four places in the Willamette Valley.

Insects Begin Summer Activities in Indiana

VINCENNES, IND.—The period for outbreaks of rosy aphids has passed. No major injury has been observed. Green apple aphids are not a threat in most orchards but wet, cool weather is favorable for their development so that orchards, especially small non-bearing trees, must be watched for their presence.

Peak oviposition of spring brood plum curculio adults has passed. A few adults can still be jarred from commercial orchards. Peach and plum growers should plan to spray for this pest at this time, as protection cannot be relied upon where sprays were applied ahead of the recent heavy rains.

First-brood red-banded leaf roller larvae are now rolling leaves and feeding on fruit. A few early larvae have pupated.

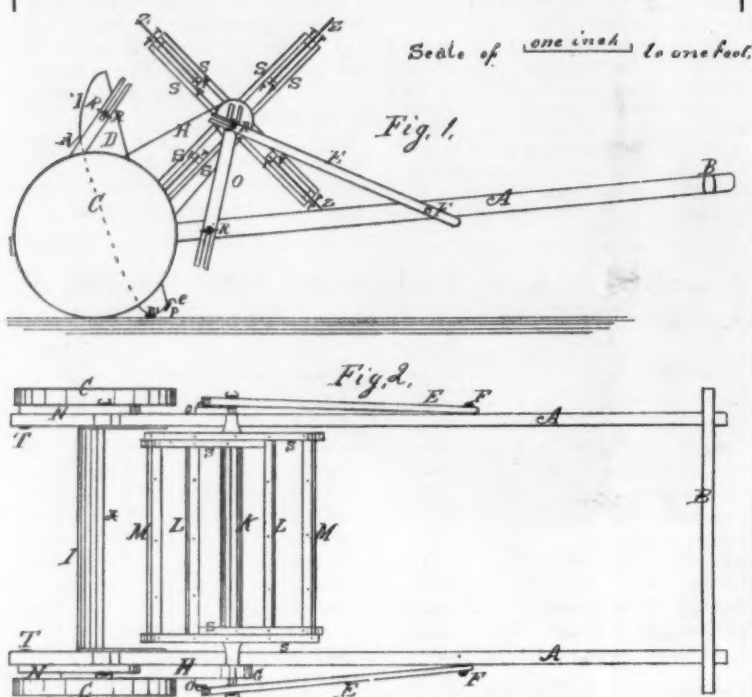
Weather conditions have been unfavorable for codling moth larvae to enter fruit. Only a few entries have been found. However, protection for this pest is needed at this time. A quick change to warmer weather could mean an increase in the number of successful entries. Approximately 50% of the larvae in overwintering cages have emerged.—D. W. Hamilton.



Leaf Rust Appears Early in Kansas

MANHATTAN, KANSAS—Leaf rust of wheat has appeared early in Kansas this year and may cause a lot of damage if favorable conditions continue, say pathologists in the department of botany and plant pathology

Saga of Insect Pest Control



The illustration above described Mr. Bennett's bug-catching machine, as published by the U.S. Patent Office in 1871.

A sort of dry-land paddle-wheel was the main feature of a "bug-catching" apparatus patented in 1871, by John M. Bennett of Jaynesville, Iowa. Designed to "provide a convenient means for catching bugs which infest potato vines," the gadget would be propelled by pulling it along the ground, activating the wooden beater which was supposed to knock the insects from the vines and into a wooden trough which was covered by canvas. This arrangement was designed to prevent escape of the pests. The trough was readily removable so the operator might dispose of his bug harvest conveniently. The patent was not concerned with destruction of the insects once they were caught.

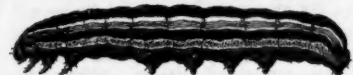
Mr. Bennett's invention was described as being an "improvement in machines for catching potato bugs . . . which infest potato vines." Drive wheels operated the beaters by means of a pulley and belt. Adjustments were described as being "very simple," requiring only that the beater be shifted by means of set-screws, and the catcher also by its own arrangement of set-screws. The movement of the beater "will cause the beater to strike the vines and drive the bugs into the trough, from which they can be removed . . ." the patent declares.

Mr. Bennett's patent was issued Nov. 28, 1871, and was numbered 121,272.

at Kansas State University, Manhattan.

Normally leaf rust does not overwinter in Kansas. It overwinters in southern Texas and Mexico and as the growing season moves northward, so do the rust spores. The spores usually arrive in Kansas around May 1. But this year rust spores did overwinter in the state and rust was present as early as April 1. As a result, leaf rust is more than a month ahead of schedule. The frequent May showers have been ideal for the spread of leaf rust.

The pathologists say it is still too early to predict what will happen this year, since environmental conditions in the next few weeks will determine how rapidly leaf rust develops. Already in southern Kansas leaf rust has caused wheat leaves to dry up, and some fields show a yellow cast due to abundant rust on the foliage. If conditions remain favorable for leaf rust, this could be a "leaf rust year."



Minnesota Reports Harlequin Bugs

ST. PAUL, MINN.—Harlequin bugs have made their debut in Minnesota, according to John Lofgren, extension entomologist at the University of Minnesota. He says the pests were apparently blown in from southwestern states. They have been seen near Slayton in southwestern Minnesota and at Foley, 75 miles northwest of the Twin Cities.

These bugs often congregate in large numbers on plants, causing the foliage to wilt and die in a few days. They attack several plants, but are most common on garden crops like cabbage and radishes, and on ornamentals like lilacs. The bugs, blown in during recent windy days, have never been seen in this state before.

The same winds most likely brought other insects in, too, such as aphids and leafhoppers, Mr. Lofgren says.

Mr. Lofgren also reports the presence of green bugs in Nicollet, Watonwan, Yellow Medicine, Lincoln, Rock and Nobles counties. "By now, they may have spread even further," he adds. Infestations vary greatly from field to field.

Nicollet County so far has suffered the most severe damage, with several oats fields discolored. Some fields may be destroyed entirely if the infestation continues to build up.

Cicadas Prominent Pests in Missouri

COLUMBIA, MO.—The most conspicuous insect over most of the state during the latter part of May was the periodical cicada. They are present in such large numbers that many people have become alarmed about the damage they might cause.

Variegated cutworms are still causing damage in southeastern counties and are threatening injury in other sections of the state. In the bootheel counties, there are instances of these worms, together with a few armyworms, moving out of legumes into cotton. Injury is severe in a very short time, since the worms are nearly full grown.

In the central section of the state, there are a good many of these cutworms in alfalfa and clover fields. Most of the worms are still small, but they may cause damage to new growth after the first crop of hay is taken off. Best way to check for the worms is to look under windrows, or scraps of hay left in the field after the hay is mowed. If the worms are present, spray before new growth is more than about 2 inches high.

Farmers have found scattered fields of corn in which wireworms are hurting the stand.

Most of the armyworm injury to small grain in the bootheel counties has stopped, and as yet, has not shown

up to any extent in other sections of the state.

A combination of parasites, predators, and disease has greatly reduced greenbug numbers during the week.

Insect Roundup Reveals Numerous Pests in Kansas

MANHATTAN, KANSAS—Date mites were found in all wheat fields observed in Rush County, Ness, Trego, Gove, Logan, Scott, Wichita, Greeley, Wallace, Sherman, Cheyenne, Rawlins, Thomas, Sheridan, Decatur, Graham, Rooks, Phillips, Smith, Mitchell. Severe damage was noted in one field in Wallace County. Damage to plants in these areas appeared to be a combination of drouth, wheat streak mosaic and date mite damage. Wheat leaves heavily infested with date mites curl so the placing of insecticides where it will be effective is very difficult.

Greenbugs were found in almost all wheat and barley fields checked in

central, west central, northwest and north central Kansas. Counts ranged from less than 10 to about 250 greenbugs per foot, with most fields having less than 50 per foot. Lady beetles as high as eight per square foot have been found in some wheat fields. The tiny black parasitic wasps eliminated the greenbug problem from the Manhattan area a week ago.

Pea aphids were found in all alfalfa fields observed in central, west central, northwest and north central Kansas. Counts ranged from less than 50 to about 300 aphids per sweep.

Spotted alfalfa aphids have been reported on second cutting alfalfa in Montgomery County. No spotted alfalfa aphids were found in first cutting alfalfa in northern Kansas. Variegated cutworms were found in alfalfa fields in Dickinson, McPherson, and Mitchell counties. Counts were less than one per sweep.

Grasshoppers were found in field margins of most fields observed in central, west central, northwest and

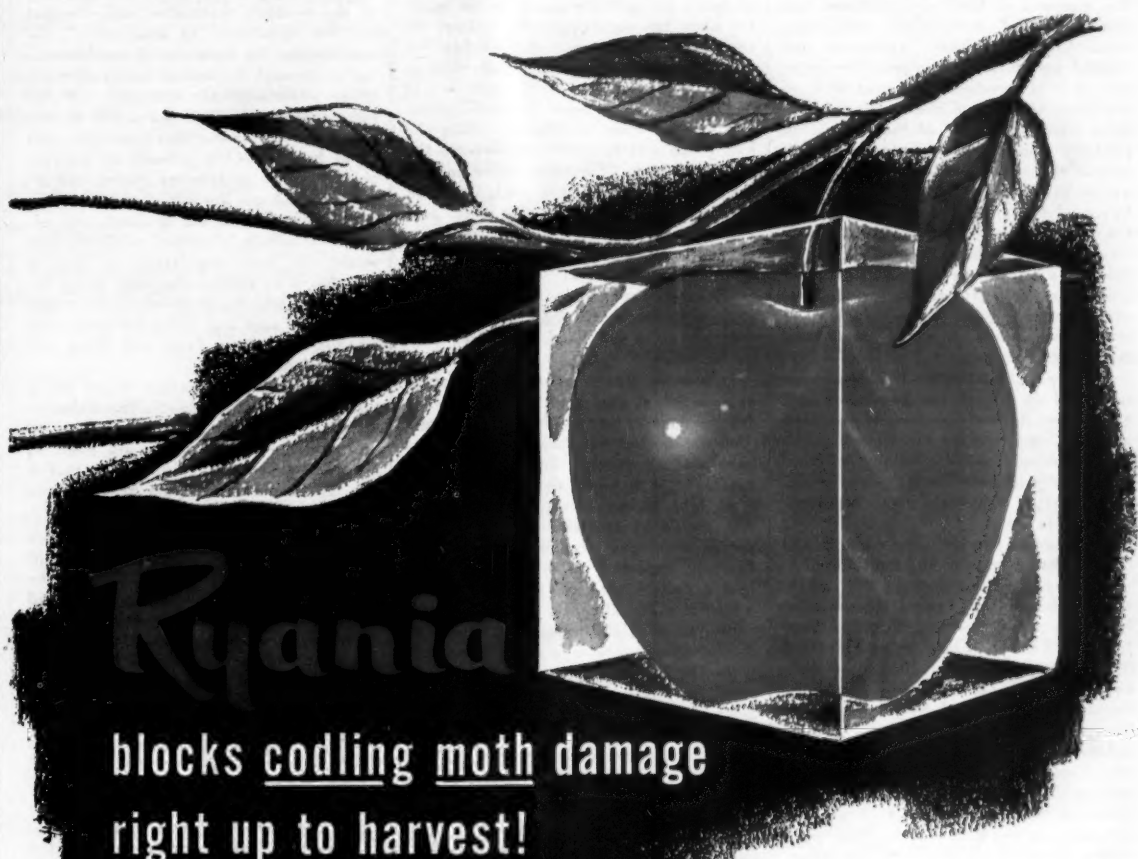
north central Kansas. The predominant species was two-striped grasshopper. Counts ranged from less than one to over 50 per sweep. Some field margins have grasshopper populations as high as 300 square yard.

Codling moths have been reported from apple orchards in northeast Kansas.

Crop Dusting Planes Sent to Yugoslavia

SAN FRANCISCO—Five biplanes of the type known all over the Pacific Northwest as workhorses of crop dusters and forest fire jumpers are on their way to Yugoslavia to aid in that country's agricultural development.

Made by Baxter Aircraft Co., Yakima, Wash., the planes departed from the Portland Commission of Public Docks' Terminal No. 2 in crates aboard two vessels of the Italian Line. The planes will be assembled upon arrival.



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Ryania is covered by Patent Nos. 2,400,293 and 2,590,536.

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NAC Official Asks House Committee to Approve Amendment to Pesticide Bill

Following is a statement presented May 21 by Lea S. Hitchner, executive secretary of the National Agricultural Chemicals Assn., before the House Committee on Agriculture, meeting in Washington, D.C. Mr. Hitchner's statement concerned H.R. 6436, a proposed amendment to the Federal Insecticide, Fungicide and Rodenticide Act which would include defoliant, plant regulators and nematocides in that act. A news story of Mr. Hitchner's statement appeared on page 1 of the May 25 issue of Croplife. The text of H.R. 6436 appeared on page 8 of the May 4 issue.

My name is Lea S. Hitchner. I am the executive secretary of the National Agricultural Chemicals Assn., located at 1145-19th St., N.W., Washington, D.C. The members of NAC are producers and formulators of insecticides, fungicides, weed killers, defoliants, desiccants and related agricultural chemicals. The members of NAC produce more than 85% of the basic agricultural chemicals and produce more than 75% of the formulated products made in this country. All members of the association and leaders in the agricultural industry have been informed by us of the pending legislation, and it has been widely publicized in the NAC News and Pesticide Review. This publication has a circulation of 13,000 going to land grant colleges, county agricultural agents, farm organizations, farm and radio press and such groups that keep the farmer informed.

A copy of H.R. 6436 has also been submitted to all of the presidents and experiment station directors of the land grant colleges and to the state agricultural chemical control officials. All comments received have been favorable and in support of the legislation. We know of no objections.

We wish to unqualifiedly endorse and request the passage of the legislation.

The proposed legislation, H.R. 6436, would amend the Federal Insecticide, Fungicide and Rodenticide Act (61 Stat. 163; 7 U.S.C. 135-135k) so as to extend its coverage to certain classes of agricultural chemicals not now regulated thereunder. These products are commonly known and referred to as nematocides, defoliants, desiccants and plant regulators. Nematocides are used to kill certain very small worms known as nematodes or eelworms which attack crops. Defoliants are used to cause leaves to drop from plants, generally to facilitate harvesting. Desiccants are used to artificially accelerate the drying of plant tissues, generally to facilitate harvesting. Plant regulators are used to alter the normal growth or other physiological processes of plants or the produce thereof, for such purposes as to promote fruit set, to promote or retard maturity and to prolong or break dormancy.

The bill would accomplish this objective primarily by expanding the present definition of "economic poison" in the Federal Insecticide, Fungicide and Rodenticide Act to include these products. It would also amend certain other definitions in the Act and add some additional ones, as necessitated by the broader coverage. However, it does not change the substantive provisions of the Act as they relate to presently regulated products.

The bill would directly subject the products involved to the same labeling, registration, and regulatory controls under the Federal Insecticide, Fungicide and Rodenticide Act as now apply to agricultural chemicals used for pest control purposes. By placing them under that Act, the bill would also place them under the "Miller Pesticide Chemicals Amendment" to the Federal Food, Drug and Cosmetic Act (P.L. 518, 83d Congress), insofar as residues in or on raw agricultural commodities may be involved, because of the interrelationship of the two acts.

In order to permit an orderly transition period for both the government and industry, provision is made whereby certain sections of the aforementioned acts

would not be applicable to these products until March 5, 1960 or such later date or dates not beyond March 5, 1961 as the secretary of agriculture and the secretary of health, education and welfare may prescribe. These dates have been specified so as to have the fully effective dates under this bill coincide with those under the Food Additives Amendment to the Federal Food, Drug and Cosmetic Act (P.L. 85-929).

Today's agriculture is largely dependent on agricultural chemicals and agricultural chemical research on which our member companies are spending more than \$20 million a year.

As new products are developed it is desirable that they be regulated in a uniform manner with other agricultural chemicals, and this bill provides for the inclusion of four categories of agricultural chemicals which have grown in importance to agriculture and to the industry since the passage of the Federal Insecticide, Fungicide and Rodenticide Act in 1947. If these products had been in commercial usage in 1947, they would undoubtedly have been included in the law at that time. In 1953-54, while the bill, which was to eventually become the Miller Pesticide Chemicals Amendment to the Federal Food, Drug and Cosmetic Act, was pending in the Congress, provision was made in it that upon inclusion of new agricultural chemicals within the scope of the Federal Insecticide, Fungicide and Rodenticide Act they would also come under the provisions of that Amendment to the Food, Drug and Cosmetic Act.

Experience has shown that regulation of agricultural pest control chemicals under the Federal Insecticide, Fungicide and Rodenticide Act has been effective and beneficial to farmers and growers. Accordingly, it appears desirable that the same type of regulation, under the same Act, should be applied to these more recently developed products. This is particularly important in view of the fact that a certain chemical may find use as a pesticide and also as a defoliant, desiccant and/or plant regulator. Thus, 2,4-dichlorophenoxyacetic acid, commonly known as 2,4-D, may be used at one concentration as a herbicide whereas at a much more dilute concentration it may be used on certain trees as a plant regulator to lessen premature fruit drop. The use as a herbicide is now subject to the Federal Insecticide, Fungicide and Rodenticide Act whereas the use as a plant regulator is not. The same situation exists as regards many other agricultural chemicals which are subject to this bill. It is desirable and important that all these agricultural uses should be regulated in a uniform manner at the federal level.

The passage of the proposed legislation would thus bring under regulation of the Federal Insecticide, Fungicide and Rodenticide Act and the Miller Pesticide Chemicals Amendment to the Food, Drug and Cosmetic Act the Agricultural Chemicals listed (defoliants, desiccants, nematocides and plant regulators). It would provide for the expert judgment by the Department of Agriculture on the agricultural considerations involved with the sale and use of these products and by the Food and Drug Administration on the determination of tolerances, if any are necessary, for the protection of the public health. It would provide a uniform procedure of control for agricultural chemicals both for the agricultural interests who use them and for the industry.

At the present time the agricultural chemicals which are the subject of H.R. 6436 are due to be regulated as food additives under the Food Additives Amendment to the Federal Food, Drug and Cosmetic Act, enacted during the last session of Congress. We believe that these chemicals should be regulated the same as agricultural pest control chemicals under the Federal Insecticide, Fungicide and Rodenticide Act and the Miller Pesticide Chemicals Amendment rather than under the Food Additives Amendment. This arrangement provides for the Department of Agriculture to decide such questions



Lea S. Hitchner

as usefulness, effectiveness and labeling of the products themselves and provides for the regulation of residues of the products by the Food and Drug Administration through the establishment of tolerances when such are necessary for the adequate protection of the public health.

It is our belief that this legislation will be of benefit to the growers by assuring careful review of labeling claims and directions for use by the Department of Agriculture before the products are offered for sale in interstate commerce and would also assist the farmer by assuring him that if he follows the label directions on these agricultural chemicals his produce will be safe and within the tolerances established by the Food and Drug Administration.

The proposed legislation would set a pattern which would enable the states to adopt similar amendments to their state pesticide laws. Many states are awaiting the passage of this legislation so that it can be adopted as a part of a uniform state legislative program.

For the benefit of the committee, we are attaching as a part of this statement a marked copy of the bill, showing the changes in existing legislation proposed by this bill. From this it may be seen that only a limited number of changes are proposed in the Federal Insecticide, Fungicide and Rodenticide Act. Most of the bill is devoted to a reproduction of unchanged sections of the Act and to provisions regarding the effective date of the bill.

Also attached as an exhibit is a memorandum explaining the scope of the term "plant regulator" as used in H.R. 6436. This reflects our understanding of the term and we believe also reflects the Department of Agriculture's understanding and interpretation of the term. We request that it be made a part of the record of these hearings.

We respectfully request your careful consideration of the proposed legislation and we hope that it will be passed at this session of Congress.

Maine Invites Bids For Fertilizer Source

ORONO, MAINE—Bid invitations to establish a source of supply for superphosphate and mixed fertilizer "in such quantities as may be required in the State of Maine" were issued recently by the State Agricultural Stabilization and Conservation office.

Needs as estimated by the Maine ASC office included 2,500 tons of 18, 19 or 20% superphosphate; 2,500 tons of 0-14-14, 0-20-20, or 0-15-30, and 10,500 tons of 8-16-16.

Deadline for submitting bids is 1:30 p.m. June 9, Eastern Daylight Time. Bids should be addressed to Lawrence A. Chatto, State Administrative Office, Maine ASC Office, The Maples, University of Maine, Orono. Name of bidder and bid invitation number should be included in lower left-hand corner of envelope. Telegraphic bids will not be considered.

California Fertilizer Use During 1st Quarter At All-Time High

SAN MARINO, CAL.—More fertilizer was used by California farmers and home owners during the first three months of 1959 than during any previous first quarter, according to the California Fertilizer Assn.

The increase over the same period of 1958 was 25 1/4%—253,545 tons were sold in California during this quarter in 1958, and 317,589 tons in the same period in 1959. Among the materials showing unusual increased use were anhydrous ammonia, up 90%; 20% aqua ammonia, up 108%; ammonium nitrate solution, 20%, up 95%; mixed fertilizers, liquid and dry, up 37 1/4%; and normal superphosphate, up 57%. Gypsum use was increased by 55%.

In the association's opinion, this gain, a continuing factor, has been brought about by an increased awareness among farmers that the proper fertilizer, applied up to the limits of recommended usage, pays the biggest profit which they can obtain on any crop production investment.

Potential average profit from fertilizer use is greater in California than it is in some other areas, said the association, because of its more extensive application of controlled irrigation, and other advanced cultural practices. California farmers are more and more aware of fertilizer possibilities, and use more each year to insure increased volume of better quality crops.

DuPont Reorganizes Chemical Departments

WILMINGTON, DEL.—Formation of a new department in the Du Pont Co. is expected to consolidate and strengthen research, manufacturing, and marketing of a wide range of agricultural products.

The new department, to be known as the Industrial and Biochemicals Department, will encompass all of the biochemical operations of the former Grasselli Chemicals Department, plus the agricultural chemicals program of the Polychemicals Department. Also combined in the responsibilities of the new department will be the industrial chemicals operations formerly handled by Grasselli, and the industrial chemicals and anti-freeze product groups previously handled by the Polychemicals Department.

The changes, effective June 1, are in line with a trend in the company toward departmental specialization to encourage maximum growth in major marketing areas.

Clark W. Davis, general manager of the former Grasselli Chemicals Department, will be general manager of the new department. With few exceptions, other personnel will continue in the same locations and the same assignments as before.

Among the biological and agricultural chemicals now consolidated in the one department are several urea feed and fertilizer compositions, insecticides, fungicides, weed and brush killers, soil fumigants, turf fungicides and the turf fertilizer, "Uramite" fertilizer compound; seed disinfectants, non-nutritive sweeteners, and chemicals for animal health and nutrition. The garden chemical line includes garden pest control formulations and various specialty items.

NEMATOLOGIST APPOINTED

UNIVERSITY PARK, N.M.—Dr. L. Vernon White has been appointed assistant professor of nematology in the department of botany and entomology at the New Mexico State University Experiment Station, according to Dr. R. H. Black, dean and director of agriculture at NMSU. Dr. White recently received his Ph.D. degree at the University of Wisconsin. His doctor's dissertation dealt with the host-parasite relation of ectoparasitic nematodes on economic hosts.

TABLE 1. Exports of Pesticides, 1958

Material	Quantity	Value	Percent of total value
	1,000 lb.	\$1,000	
Benzene hexachloride (gamma basis, 6% plus)	1,538	1,482	1.81
Calcium arsenate	1,274	81	.10
Copper sulfate (normal and basic)	14,495	1,176	1.43
2,4-D and 2,4,5-T (acid basis)	6,788	2,929	3.57
DDT, technical	25,292	5,068	6.18
DDT (20-74%, 100% basis)	4,701	1,751	2.13
DDT (75% plus, 100% basis)	40,118	11,993	14.61
Disinfectants, household and industrial	9,070	3,509	4.28
Fumigants	4,184	1,112	1.35
Fungicides, n.e.c.	15,127	7,642	9.31
Herbicides, n.e.c.	11,651	5,987	7.30
Lead arsenate	2,100	412	.50
Nicotine sulfate (40% basis)	62	56	.07
Organic phosphorus insecticides (15% plus)	5,383	4,244	5.17
Paradichlorobenzene	2,870	390	.47
Polychlor insecticides (15% plus) 1/	53,502	17,625	21.48
Pyrethrum extract	56	184	.22
Sulfur, agricultural, n.e.c.	9,246	270	.33
Agricultural insecticides, n.e.c.	77,706	10,612	12.93
Household and industrial pesticides, n.e.c.	18,212	5,544	6.76
TOTAL	2/	82,067	100.00

1/ Includes aldrin, chlordane, DDD, dieldrin, endrin, heptachlor, methoxy-chlor, toxaphene and related chemicals and mixtures thereof.

2/ No total given because BHC is reported only in terms of the gamma content, DDT as 100% technical, and 2,4-D and 2,4,5-T on the acid basis.

TABLE 2. Manufacturers' Stocks, Sept. 30, 1958

Material	Percentage of :		1958 stocks	
	: All stocks	: stocks (tech. :	: reported as percentage	: as percentage
	: reported as of: basis)	: reported as of: basis)	: reported as of: basis)	: reported as of: basis)
	: Sept. 30, 1958:	: Sept. 30, 1958:	: Sept. 30, 1958:	: Sept. 30, 1958:
	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.
Aldrin, chlordane, dieldrin, endrin, heptachlor, toxaphene	33,138	43.9	98	96
BHC, including lindane (gross basis)	33,644	--	--	93
Same (gamma basis)	8,032	25.2	122	90
Calcium arsenate	9,760	26.1	125	132
Copper fungicides	15,535	5.8	130	126
2,4-D (acid basis)	25,786	44.5	139	142
DDT	26,309	37.4	85	75
Fumigants, grain and soil	26,398	--	57	55
Lead arsenate	3,327	36.0	106	108
Miticides, miscellaneous	2,030	59.0	140	159
Organic phosphorus compounds	13,401	32.3	159	223
Sulfur, ground	26,913	50.8	95	--
2,4,5-T (acid basis)	5,308	48.4	114	96
Other fungicides	9,483	37.8	96	70
Other insecticides	13,852	72.7	90	94
Other weed killers	11,430	67.7	116	123
Miscellaneous, including rodenticides	2,320	--	--	--
Total	258,634 1/	48.2	96	93

1/ Results of survey by U. S. Department of Agriculture in cooperation with the National Agricultural Chemicals Association, final report.

2/ Based on all paired reports for both technical and formulated goods (technical basis).

3/ Based on goods in the possession of their primary manufacturer; i.e., DDT stocks of DDT producers.

4/ BHC (gamma basis) omitted to avoid duplication.

TABLE 3. Cotton Insecticides Used in 1958 in Certain States

Material	Alabama		Arkansas		Louisiana	
	Pounds dust	Gallons spray	Pounds dust	Gallons spray	Pounds dust	Gallons spray
Calcium arsenate	136,600	--	673,293	--	3,222,217	--
Calcium arsenate - DDT - parathion mixtures	--	--	--	--	678,350	--
Toxaphene and toxaphene - DDT	10,057,300	--	5,675,525	439,979	531,300	141,925
BHC, DDT, and mixtures of these	8,900,375	--	17,128,340	66,084	5,345,850	135,098
Aldrin, dieldrin, endrin, and their mixtures	626,275	--	1,611,781	234,517	1,715,150	45,239
Heptachlor - DDT	--	--	54,731	585	3,425,000	500
Malathion, parathion, and their DDT mixtures	--	--	1,983,396	231,122	177,550	32,687
Methyl parathion, Guthion, and their DDT mixtures	--	--	589,300	808,422	2,904,100	188,216
Other chemicals	--	--	729,698	150,536	107,500	100
Totals	19,720,550	88,948 1/	28,446,064	1,931,245	18,107,017	543,765

1/ No breakdown available.

Sources: Extension Entomologist of each respective State.

TABLE 4. Aerial Application of Pesticides and Defoliants—1957

Activity	Area treated	Materials dispersed	
	1,000 acres	Dry 1,000 lb.	Liquid 1,000 gal.
Insect control, total	46,157	215,269	64,618
Crops, orchards, etc.	30,472	213,902	51,946
Forests	10,338	151	7,698
Towns	2,695	517	2,251
Soils	2,652	699	2,723
Plant disease control	1,048	13,725	3,103
Weed control	6,904	12	12,112
Brush control	585	172	2,294
Defoliation	2,094	12,968	11,415
Total	56,788	242,146	93,542

Source: CAA Statistical Handbook of Civil Aviation, 1958 edition.

TABLE 5. Producers Sales of 2,4-D and 2,4,5-T Esters

Derivative	1955	1956	1957
	1,000 lb.	1,000 lb.	1,000 lb.
2,4-D:			
n-Butyl ester	3,648	4,146	4,685
Iso-octyl ester	1,440	821	1,082
Isopropyl ester	3,675	4,844	2,943
All other esters	4,215	4,497	4,187
2,4,5-T:			
n-Butyl ester	195	168	151
Iso-octyl ester	369	757	796
All other esters	1,811	2,323	2,001

Source: U. S. Tariff Commission, "Synthetic Organic Chemicals; United States Production and Sales."

TABLE 6. Solid Diluents Used in Pesticide Formulations—1954-57

Material	1954	1955	1956	1957
	1,000 lb.	1,000 lb.	1,000 lb.	1,000 lb.
Talc and soapstone	96,524	126,944	109,586	90,368
Pyrophyllite	81,950	108,658	86,264	84,332
Fuller's earth	142,488	182,078	228,854	134,954
Kaolin	57,938	79,424	80,480	78,300
Bentonite	5,162	32,932	37,694	37,486
Other	8,592	9,434	6,480	3,250
Totals	392,654	539,470	549,358	428,690

1/ Figures for 1958 not yet available.

Source: U. S. Bureau of Mines, Division of Minerals, Branch of Ceramic and Fertilizer Materials.

USDA Report on Pesticide Situation

WASHINGTON—DDT led in dollar value of exports in 1958 (Table 1), with other "polychlor" insecticides nearly as high, reported the Agricultural Chemical Staff, U.S. Department of Agriculture, in its annual publication, "The Pesticide Situation." Harold H. Shepard was in charge of compiling the information. (See CROPLIFE, page 1, May 25.)

These materials (DDT and the other polychlors), the report continued, constituted almost 45% of all pesticide export value for the year.

Stocks of pesticides on hand at the end of the 1958 growing season were 4% below those at the same date a year earlier (Table 2).

Only scattered data was available showing quantities of insecticides applied in some states (Table 3).

The acreage of crops, forests, etc., treated with pesticides from the air

in 1957 was 18.4% over 1956 and 24.9% over 1955 (Table 4).

Of producers' 1957 sales of 2,4-D esters, those of the N-butyl ester comprised 36.3% and of the iso-octyl derivative 8.4%. Sales of the iso-octyl ester of 2,4,5-T amounted to 27% of all 1957 sales of 2,4,5-T esters (Table 5).

The consumption of dust carriers and diluents in the manufacture of pesticidal preparations in 1957 was 22% lower than the year before, on the basis of the materials for which statistics are available (Table 6).

Monsanto Announces Assignment Changes

ST. LOUIS—Three changes of assignment for production executives of Monsanto Chemical Co. have been announced by Howard L. Minckler, director of manufacturing for the company's Organic Chemicals Division.

Robert E. Soden, manager of the company's Nitro, W.Va., plant, has been appointed manager of the William G. Krummrich Plant at Monsanto, Ill. He succeeds Joseph Cresce who is being loaned to Monsanto Chemicals Ltd., England, to be responsible for production there.

Paul W. Edwards, manager of Monsanto's Avon, Cal., plant, has been appointed plant manager at Nitro, W.Va., and Karl Ellingson, general manufacturing superintendent at the John F. Queeny Plant here, has been designated plant manager at Avon, Cal.

TURFGRASSES CIRCULAR

FORT COLLINS, COLO.—A new circular, "Colorado Turfgrasses," has been published by the Colorado State University Extension Service. The 28-page circular is designed for people who have more than a casual interest in turfgrasses. The author, Jess L. Fuels, head of the CSU botany and plant pathology department, describes the parts and growth characteristics of turfgrasses. He selects 51 of the most common turfgrasses found in Colorado and outlines a key to identification. Drawings of these common turfgrasses also are included.

Substitution of Fertilizer for Land To Reduce Cost of Crop Production

By D. B. IBACH*

Farm Economics Research Division, Agricultural Research Service, U.S. Department of Agriculture

Farmers and farm management workers usually think in terms of the optimum level of technology for most profit per acre with a fixed acreage. Little attention has been given to the concept of optimum combination of all resources, including land as a variable along with the others, for highest profit in producing a given volume of production.

For example, a dairy farmer with a given size of herd may be interested in obtaining a specified quantity of forage. This concept becomes increasingly important with the growth of technology and specialization and the persistence of farm surpluses.

Whether the volume of a farmer's output is determined by him or is imposed by production quotas, the economic objective for him is to know and obtain the optimum balance among all resources — the balance needed to obtain minimum unit cost. This will also be the highest profit combination for a given volume of production.

Most cost-reducing crop practices tend also to increase yields and total output. The purpose here is to point out the effects of changing technology on costs of crop production, and to suggest how knowledge of yield responses to various practices can be used in making adjustments to obtain the most profitable combination of resources for producing a given volume of production.

The use of fertilizer, irrigation, rates of seeding and weed control are practices that can be used in varying degrees of intensity. To some extent, they are all substitutes for each other and for land and other resources. Fertilizer is used here to illustrate the effect of intensity in the use of one of these practices on costs of production. But in all that is said about fertilizer, it is necessary to realize that the effect of varying its rate of use on costs depends on other practices used as well as on factors beyond farmers' control. Advancing technology permits a farmer to increase the number of factors over which he does have control.

It has been estimated that with average levels of other practices, the added crop output per ton of plant nutrients at 1954 rates of application was equivalent to the production then obtained from about 10.7 acres; the expenditure per acre for fertilizer was \$9.88. This is the estimated average

for all cropland and cropland pasture in all areas and permanent pasture in the humid areas.

A ton of plant nutrients (N, P₂O₅, and K₂O) in the proportions used on the average for all crops and pasture in the United States in 1954 costs about \$230. As operating costs per acre increase only slightly with higher yields, U.S. farmers in the aggregate could profitably substitute a ton of plant nutrients for about 10.7 acres in maintaining current levels of production, provided other operating costs average more than \$11.62 per acre [(\$230/10.7) — \$9.88].

The profitability of substitution of fertilizer for land increases with the rise in other variable costs of crop production. If in the long run, fixed costs could be reduced, it would be profitable, at the 1954 average rate of application, to substitute fertilizer for land when these other variable costs average less than \$11.62 an acre.

Thus, the opportunities provided by advancing technology make it important to consider land as a variable input. To do this requires knowledge not only of the cost of applying the new technology in question, such as use of more fertilizer, but also knowledge of the other variable costs per acre of producing the crop.

These other variable costs are those that would be avoided if the crop were not grown. They include costs of preparation of the land, planting, cultivating, and harvesting and costs of all annual practices for control of weeds, insects, diseases and so on.

The fixed costs, such as interest on investment in land, improvements and machinery, taxes on real estate and other property, and charges for depreciation and insurance do not depend upon whether a crop is grown in any particular year. Thus, a fixed output of a crop may often be obtained more cheaply by improving technology and leaving some land idle.

Based on some generalized estimates of yield response to fertilizer for the Corn Belt, the accompanying table shows the fertilizer-land substitution that is associated with optimum use of fertilizer to obtain a specified total production of corn, depending on the level of other variable costs per acre.

In 1954, the latest year for which an estimate is available, Corn Belt farmers applied about 86 lb. of plant nutrients per acre of corn fertilized at a cost of \$8.81 an acre. At that rate, a ton of plant nutrients could substitute for 10.3 acres. The yield per fertilized acre was about 60.2 bu., and it would have

taken 166.2 acres to produce 10,000 bu. As a ton of plant nutrients used on corn cost about \$228, other variable costs per acre would have had to be as low as \$13.38 [(228/10.3) — \$8.81] in order to justify use of 166.2 acres in producing 10,000 bushels.

In terms of the table, if a farmer's other variable costs per acre of producing corn are \$35, and fertilizer costs \$228 per ton of plant nutrients, the cheapest way to get 10,000 bushels of corn is to apply 240 lb. of plant nutrients per acre on 102.4 acres.

This raises the question of what the farmer would do in view of decreased need for land in corn. The answer would depend on the farmer's situation. Some will direct this land to a soil-conserving use or put it in the soil bank. Other farmers will find the use of this released land a desirable alternative to renting or buying land to expand their volume of business. Still others will use the land to produce more of the same or other crops for market.

In the aggregate, substitution of improved technology for land is likely to increase farm output. Improved practices that have been profitable to individual farmers are such that the total output of most crops has increased, even though the acreage of some has declined as a result of acreage adjustment and soil-bank programs. With a combination of improved practices and land selection, increased yields have more than offset those acreage reductions that have occurred. Further, the use of new technology has not been accompanied by reduction in the aggregate acreage used. Knowledge of the effects of improved technology can be used to suggest the optimum combination of resources, including land, in reducing costs.

Federal Chemical Co. Names Sales Manager

LOUISVILLE, KY.—Victor C. Hemeier has been named assistant division sales manager of Federal Chemical Co. at its Butler, Ind., plant. Mr. Hemeier has been associated with the fertilizer industry in Indiana for ten years. In his newly-created position he will assist Floyd L. Lucas, division sales manager at Butler.

USDA Studies Show Alfalfa Damage by Stem Nematodes

WASHINGTON — Stem nematodes cut annual forage yields of Ranger alfalfa by 1½ tons an acre and, over a 5-year period, reduced plant stands 35% in experiments at Reno, Nev., according to the U.S. Department of Agriculture.

But the nematodes did not affect yields and stands of the resistant alfalfa variety, Lahontan. Dr. Oliver F. Smith and Richard W. Peaden of USDA's Agricultural Research Service reported. They conducted the studies in cooperation with the Nevada Agricultural Experiment Station.

Extent of damage to susceptible alfalfas such as Ranger depends on whether conditions favor stem nematode development and how long infestations have existed, the scientists said. Stem nematodes cause greatest injury to the first new alfalfa growth of the season. Plants sometimes appear to recover temporarily and grow normally until conditions again favor the parasites.

Ranger yielded a yearly average of 6½ tons per acre and Lahontan, a variety adapted to western states, yielded 6½ tons in plots kept free of stem nematodes during 1952-56. In adjacent infested plots, average annual yields of Ranger were less than 4½ tons an acre for the years 1954-58 and plant stands decreased progressively, while Lahontan yielded an average of 6 tons per acre and maintained full stands. The scientists attributed a net average annual reduction of 1½ tons per acre of the Ranger yields to nematode damage.

Stands of susceptible alfalfa are decreased by stem nematode infestations of young crown buds, which fail to produce new growth. Consequently, infested plants are dwarfed, have few branches, and die in a year or two. Stem nematodes also cause alfalfa plant crowns to rot. Weeds easily become established in thin stands of weak alfalfa plants.

Escambia Manager Dies In Baltimore Plane Crash

BALTIMORE—Dr. Leslie G. Boatright, 34, manager of the chemical sales development department of Escambia Chemical Corp., was killed recently in an airplane crash near here.

Dr. Boatright had been with the firm since 1956. Prior to that he was with the Jefferson Chemical Co., and before that with the Stamford Research Laboratory of American Cyanamid Co.

*This article is reprinted from the current issue of the Farm Cost Situation, published by the U.S. Department of Agriculture.

Specified variable costs per acre of producing corn, optimum fertilizer-land substitution rates, rates of application, yields and acreages required to produce 10,000 bushels.

Variable costs per acre excluding fertilizer ¹	Optimum substitution of plant nutrients for land	Application of plant nutrients per acre	Yield per acre	Optimum acreage to produce 10,000 bushels ²
Dollars	Acres per ton	Pounds	Bushels	Acres
15	8.15	110	69.2	144.5
20	6.00	162	81.4	122.8
25	4.92	196	88.8	112.6
30	4.21	221	93.8	106.6
35	3.71	240	97.7	102.4
40	3.32	258	100.7	99.3
45	3.04	273	102.8	97.3
50	2.80	287	104.6	95.6
55	2.60	289	106.1	94.3

¹A farmer would find his cost in this column and read to the right for the optimum rate of application and yield.

²The specified production desired divided by the yield per acre shows the optimum acreage to be grown.



WHEN FLORIDA Governor Leroy Collins (left) visited Plant City, Fla., for the city's annual Strawberry Festival, he stopped in at the Coronet Phosphate division of Smith-Douglas Co., Inc., to extend congratulations to the firm on its 50th anniversary. Shown with the governor are R. M. Wilbur, manager of Coronet, and Mrs. Pat Whittaker, Jr., member of the Florida legislature.

'Complete' Fertilizer Service Builds Sales

By RUEL McDANIEL
Croplife Special Writer

Featuring and consistently promoting a complete fertilizer service has been a major factor in building a 1,000 ton annual fertilizer volume for Garwood Implement & Supply Co., Garwood, Texas. The business is largely among rice farmers and other large-scale planters, according to Robert L. Wells, Jr., company manager.

In this area, most fertilizer for rice is applied by airplane. Under a former system, the farmer could make his own deal with some aerial applicator, or the company would handle it for him if he wished.

Today, the customer gets everything in one flat-rate job and price. Customers like it better this way, as is eminently evident in the increase in volume since adoption of the all-in-one deal.

"The former method of selling helped us, however, in arriving at a fair price for the all-in-one job—fair for both the customer and us," Mr. Wells points out.

Formerly the company sold fertilizer at the plant at a specific price. If the customer wanted it hauled to the farm and distributed where needed for the airplane dusters, that was another price; and if the company was expected to furnish labor to load the fertilizer into the dusting planes, that meant an additional charge. Customers could make their own deals with the airplane men, or the company would make arrangements and add the dusting charge to the total cost of the fertilizer.

"Because we could not always control the cost of the various steps in the process of selling to the final application, we had to charge the customer more in the aggregate for all these individual services than we do now," Mr. Wells explains. "But the cost figures we compiled under that program helped us greatly in arriv-

ing at our rate for the job of today."

The flat price charged for a complete job now is \$19 per ton, plus the cost of the fertilizer. This, of course, varies the final total, in accordance with the fertilizer sold. Regardless of what fertilizer the customer selects, the \$19 per-ton figure remains fixed. It includes everything from hauling the order to the fields, to distributing it by plane.

Under this plan, the customer may sit in his own office or home, telephone Mr. Wells, tell him what specific fertilizer he wants, where he wants it distributed and when, and then forget it. The company takes over from there.

"Customers like the plan particularly for this reason," Mr. Wells explains. "Rice farmers have a lot of things on their mind at planting time, and when they find some outsider who is willing to take over one of these major problems when they're busy with many others, they appreciate it."

The company actually can supply the labor necessary to haul the fertilizer to the farm and load it into the dusting planes cheaper than the customer can, because it has labor hired on a daily basis and is able to keep

(Turn to 'COMPLETE,' page 13)



A WORKER at the Garwood Implement & Supply Co., Garwood, Texas, removes a pallet load of fertilizer in the warehouse, preparatory to loading on a truck. One man and one fork-lift do the work of eight laborers working by hand, says Robert L. Wells, Jr., manager.

Emphasis on Fertilizer, Insecticides Builds Reputation of Specialist for Woman Dealer

By PHIL LANCE
Croplife Special Writer

By placing emphasis on fertilizer and insecticides, the Home Lawn & Garden Center, Eddington, Pa. has built up a reputation as a specialist in all forms of growing and has enjoyed an increased sales volume since its inception three years ago.

"Too little emphasis has been placed on these products and home owners, as well as crop raisers, are not enjoying the greatest potential because of it," explains Mrs. Marie F. Beer, store manager. "Fertilizers and insecticides are not considered sidelines to us. We promote them aggressively and in return enjoy satisfied customers who come in to make their other purchases."

The center is continually urging its customers to bring in a soil sample for testing. This forms the basis of the fertilizer required for the particular area and the grass, crops or flowers that are to be raised. Customers are informed that no matter how good a lawn they may have or how well their crops are growing, that a proper application of fertilizer will further enhance the growth. By providing a fertilizer spreader with every fertilizer purchase and other equipment for the liquid fertilizer, this material is purchased more readily.

"We carry a large stock of insecticides which we notice a maj-

ority of our customers keenly examine but do not purchase," points out Mrs. Beer. "This is because they know insecticides are necessary for the protection of their plants but they aren't sure which brand or type they need for their particular situation. We make it a point to know what situations are evident in the area so that we can make immediate recommendations to our customers. We have found that once customers have made a purchase and enjoy satisfaction, they continue to buy the same product without any sales effort on our part."

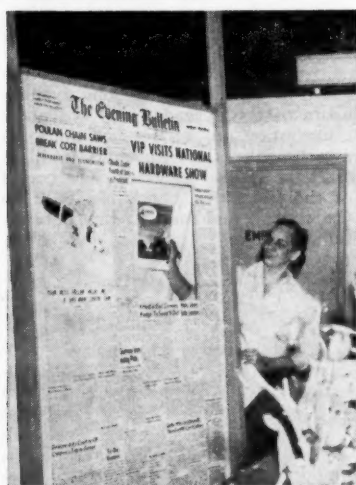
Free literature on the care and maintenance of lawns, gardens and crops is distributed to all incoming customers and box holders in the area. This is a service not offered by other types of dealerships which handle lawn and garden equipment, seeds and other basic essentials. Mrs. Beer has found that when the average customer receives this literature his attention to material on the proper maintenance and development of his lawn and crops make a greater impression on him. While fertilizer may be considered the "second item" sold to a customer, past activities have shown that when customers come in to make inquiries about it, they usually make their initial purchases here which include grass seed, flower seeds, vegetable seeds and plants as well as garden tools and power equipment.

"Backyard raising is very popular hereabouts with customers raising such items as tomatoes, sweet potatoes, asparagus and fruit trees that bear peaches and apples. While a farmer may be better informed and know the exact type of fertilizer that he needs, the routine customer is not aware of them and needs help along these lines. In our doing so, we automatically establish ourselves as specialists in the problems of raising and growing which helps us to overcome competitive conditions which exist in our area."

The Home Lawn & Garden Center attracts its customers to its location by promoting fertilizer's importance to the customer. In these days of specialization, customers like to buy from a dealer who is considered an authority on the merchandise that he handles. Once this is established, this dealer sets himself up for good.

The store only handles nationally branded lines of fertilizer, insecticides, lawn and garden seeds and various chemicals. The average customer is already familiar with these brand names and it only takes a little salesmanship to sell the customer on this merchandise. By featuring its four-man service shop and its complete line of replacement parts, this dealer has a strong sales point when promoting its line of equipment and tools. Its line of fertilizers, insecti-

(Turn to REPUTATION, page 14)



MRS. MARIE F. BEER, manager of the Home Lawn & Garden Center, Eddington, Pa., shows a unique promotion worked out by the firm. A blown-up front page of a newspaper has certain spaces cut out where she makes timely insertions of promotion material of her own products.

WHAT'S NEW

IN PRODUCTS • SERVICES • LITERATURE

To obtain more information about items mentioned in this department simply: (1) Clip out the entire coupon in the lower corner of this page. (2) Circle the numbers of the items of which you want more information. Fill in the name and address portions. (3) Fold the coupon double with the return address portion on the outside and fasten the edges with a staple, cellophane tape or glue. (4) Drop in the mail box.

No. 6916—Hydraulic Lift Truck

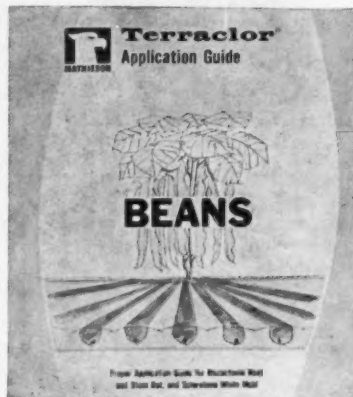
A hydraulic lift truck for inplant materials handling has been announced by Industrial Handling Equipment Co., Inc. The unit has a built-in hydraulic system that has wear resistant packings and takes a minimum number of pump strokes to achieve a 5 in. lift, company litera-



ture said. Lowered height of forks is 3½ in. and raised 8½ in. The wheels roll on encased ball bearings and pivot 90° in both directions. Units are available in either 2,400 or 4,400 lb. capacities with 36, 42 or 48 in. fork lengths and 20½ or 27 in. width. For details, check No. 6916 on the coupon and mail.

No. 6917—Bean Fungicide Guide

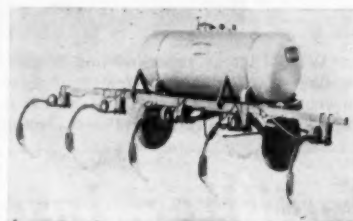
A Terraclor application guide for beans giving detailed information on the use of this soil fungicide is now being distributed by Olin Mathieson Chemical Corp. The illustrated 4-page guide's objective is to control root



and stem rot and white mold. The guide tells how to get the most from Terraclor. It is a compilation of work by Olin Mathieson fieldmen, federal and state research personnel and growers who have used Terraclor to control the disease. Additional information can be obtained by checking No. 6917 on the coupon and mailing.

No. 6918—Ammonia Applicator

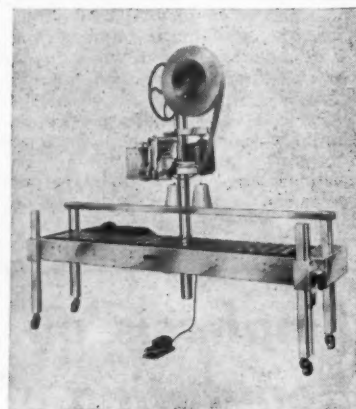
John Blue Co., Inc., has introduced an ammonia applicator called the



"Blue Nitro-Shooter" series "80." The machine has a tank capacity up to 310 gal., full 26 in. clearance, transport lock, alloy steel spindles, heavy duty Timken bearings, 12 ft. tiered free, 3 in. sq. tool bar and a short turning radius. It has a welded chassis. The machine comes with either 100, 150, 200, 250 or 310 gal. tanks. The metering device is a AND-Y pump or Nitrolator with speed and quantity control. The chassis has an 80 in. tread and over-all width of 96 in. The applicator comes with 1¼ or 1 in. alloy steel spring tine or high carbon rigid shank. The tool bar has an 8 ft. straight or 14 ft. folding length. For details, check No. 6918 on the coupon and mail.

No. 6919—Adjustable Conveyor

The Minneapolis Sewing Machine Co., Inc., announces a new model LS-100 adjustable conveyor which features an all-metal slat type conveyor belt. The conveyor and the sewing head can be regulated to the



correct position for the operator's size and the size of the bag to be closed. Of all metal construction, the LS-100 conveyor raises or lowers with a turn of the crank, giving vertical adjustment to sew any size bag from 5 lb. to 200 lb. The chain driven slat conveyor is powered by a heavy duty gear head motor. For details check No. 6919 on the coupon and mail to this publication.

Also Available

The following items have appeared in previous issues of Croplife. They are reprinted to help keep dealers on the regional circulation plan informed of "What's New."

No. 7499—Recirculating Fan

The availability of a self-contained, recirculating fan for ventilation of out-door storage structures has been announced by Sprout, Waldron & Co., Inc. The fan is small and compact, the company stated, and is powered by a 1 h.p. totally enclosed 3450 rpm. motor. A weighed check valve prevents material from being blown out through the fan and into the filter when the storage is being filled. For details, check No. 7499 on the coupon and mail to this publication.

No. 6911—Fruit Grower's Chart

Colloidal Products Corp. has announced the availability of the Western Fruit Grower's "Compatibility

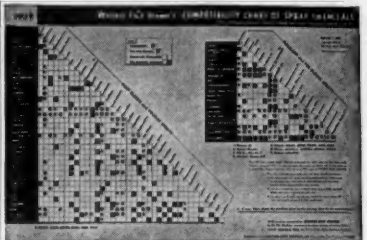
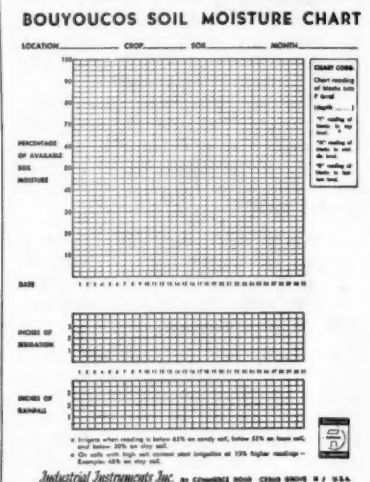


Chart of Spray Materials," prepared by Dr. Harold F. Madsen of the University of California and Dr. Stanley C. Hoyt of Washington State College. The chart is printed on a plastic card, in color and is shirt pocket size. Copies can be obtained by checking No. 6911 on the coupon and mailing to this publication.

No. 6914—Soil Moisture Charts

Industrial Instruments, Inc., announces the availability of a pad of soil moisture charts for plotting



measurements obtained for Bouyoucos Soil Moisture Meters and Blocks. Each chart provides room for recording percentage of soil moisture for a 31 day period as well as separate charts for indicating inches of irrigation and inches of rainfall. A free pad of these charts is available to Bouyoucos meter users. Check No. 6914 on the coupon and mail to this publication.

No. 6912—Spreader Literature

Literature on the "New Leader L-32S" engine driven combination lime and fertilizer spreader is available from Highway Equipment Co. The illustrated brochure contains specifications, construction features, detailed drawings of various components of the spreader and operating information. A section on optional attachments, with appropriate illustrations, is also included. For copies of the literature, check No. 6912 on the coupon and mail to this publication.

No. 6909—Mobile Power Sprayer

A mobile power sprayer that produces a steady flow instead of pulsating streams is now available from the John Bean Division of Food Machinery & Chemical Corp. The unit, called the Trojan, sprays insecticides, liquid fertilizers, and root-feed compounds. Feature of the sprayer is a centrifugal pump of which all major parts are made from a glass-fiber reinforced plastic, Thermoflow 100, developed by Atlas Powder Co. The pump has only one moving part. The unit delivers steady pressure at any engine speed, the company noted, and is driven by a 2½ h.p. gasoline

Send me information on the items marked:

- ☐ No. 6905—Chemicals Display Rack
- ☐ No. 6906—Bean Insecticide Booklet
- ☐ No. 6907—Organic Fungicide
- ☐ No. 6908—Light-Weight Hand Pump
- ☐ No. 6909—Mobile Power Sprayer
- ☐ No. 6910—Peanut Fungicide Guide

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COMPANY

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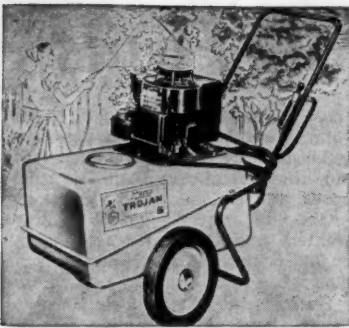
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engine. It can deliver up to 3 gal. a minute at 60 lb. per sq. in. of pressure. The stream will reach a height of 30 ft. A 15-ft. hose is designed for high-pressure corrosion-resistant service. Check No. 6909 and mail for details.

No. 6905—Chemicals Display Rack

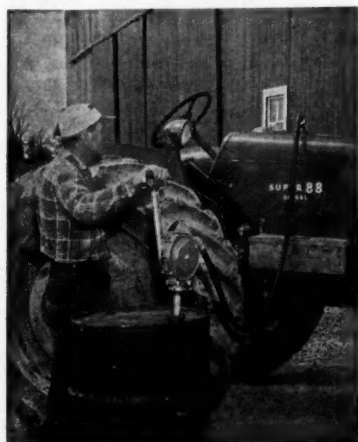
A wire display rack, filled with products, is being distributed by the Douglas Chemical Co. as part of a farm grain sanitation program to help farmers keep their on-the-farm



stored grain free of damaging insects. The rack, which stands 40-in. high, is topped by a three color, 8-in. sign. The width of the stand is 29 in. The purpose, according to company literature, is to have dealers join the Douglas 1959 farm grain sanitation program. More information is available by checking No. 6905 on the coupon and mailing to this publication.

No. 6908—Light-Weight Hand Pump

A light-weight hand pump designed to handle liquid fertilizers, tractor fuels, gasoline, lubricating oils and other solutions, has been announced by the Wayne Pump Co. Called DD-1, the pump can be supplied with any required accessories, including regular or no-drip spouts, pedestals, suction pipes, hoses, meters and check valves. Two special composition diaphragms and two sets of reinforced



valves provide pumping on both push and pull strokes. Delivery is about 20 gal. per 110 strokes. The stainless steel shaft operates in a heavy-duty nylon bearing, which is isolated from liquid flow by the double internal diaphragm. The company lists ease of cleaning as one of the unit's major features. For details, check No. 6908 on the coupon and mail.

No. 6915—Folder on Weed Killer

A folder is now available on "Urox" weed killer from Allied Chemical. According to the folder the product can be sprinkled or spread on soil to kill all weed growth in non-crop areas. The folder is illustrated with photos showing some of the weed control results that can be expected. General use information and application are included. For copies, check No. 6915 on the coupon and mail to this publication.

No. 6906—Bean Insecticide Booklet

Use of Sevin insecticide on beans is described in a folder available from Union Carbide Chemicals Co., Division of Union Carbide Corp. Features of the insecticide are outlined in the booklet and application rates

and directions are included. Copies of the folder designated F-40471, can be obtained by checking No. 6906 on the coupon and mailing to this publication.

No. 6913—Folder on Miticide

A revised folder on "Genite," a miticide which is said to kill plant mites and their eggs in one spray, is available from Allied Chemical. The folder contains spreading information, and describes features of the product. Economics of using the spray are discussed and general use information is given. For copies, check No. 6913 on the coupon and mail to this publication.

No. 6910—Peanut Fungicide Guide

A Terraclor application guide for peanuts giving detailed information on the use of this soil fungicide is now being distributed by Olin Mathieson Chemical Corp. The four-page, illustrated guide is designed to help control Southern blight. It contains a compilation of work done by Olin Mathieson fieldmen, federal and state research personnel and growers. For more information check No. 6910 on the coupon and mail.

No. 6907—Organic Fungicide

Information about "Dyrene," an organic fungicide and its use on celery, has been made available by Chemagro Corp. Results of six years of research and testing of the product are given. Other crops on which it is effective are also discussed. Recommendations as to use, spraying techniques and application instructions are listed. For details, check No. 6907 on the coupon and mail to this publication.

Uses Garbage Dump

SALT LAKE CITY—The city commission of Salt Lake City has agreed to let Roy Allen Behunin make use of an abandoned 50-acre garbage pile for 15 years for treatment with chemicals to turn it into fertilizer and top soil.

After this period, the city is to receive the land—with all the garbage removed—cleared and ready for development.

NEW OPERATION

DAYTON, WASH. — Ben Pool, owner of Pool Feed Store of this city, has sold the firm to Len Peterson and Fay Startin, both of Dayton. The new owners assumed management of the outlet on May 1.

Books on Pesticides

THE GARDENER'S BUG BOOK (1956)

Dr. Cynthia Westcott

The Complete Handbook of Garden Pests and their control. Information, scientifically accurate but easy to read on 1,100 insects, mites and other animal pests that attack trees, shrubs, vines, lawns, flowers, fruits and vegetables in home gardens. Illustrations in full color. Control measures combine the latest in chemical developments with time-honored cultural measures. Helpful to all who serve the general public and to truck farmers and fruit gardeners.

579 pages, cloth bound \$7.50

HANDBOOK OF AGRICULTURAL CHEMICALS—Second Edition

Lester W. Hanna, Agricultural Enterprises, Forest Grove, Ore.

As the title implies, this book contains broad information and tables on not only the chemical products themselves, but also on toxicity, residues, registration, terminology and emergency treatments. A fold-out chart gives compatibility data on numerous materials for formulators. Information on fertilizers includes soil elements, trace minerals, and application techniques. Descriptive material is also presented on fumigants, fungicides, herbicides, systemics, growth modifiers, livestock chemicals, rodenticides, and antibiotics. Information on materials and techniques is written fully with illustrations and tables. 490 pages.....

\$5.95

INSECT PESTS OF FARM, GARDEN and ORCHARD—Fifth Edition (1956)

Leonard M. Peairs and Ralph H. Davidson

A standard text for 44 years. Includes insects affecting grasses, grains, cotton, legumes, vegetables, flowers, fruits, stored products, household goods and domestic animals. Contains a new chapter on insecticide formulations, spray mixtures, application equipment, etc. Material on forty new pest species added, including drastic changes in the illustration. 661 pages

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Reducing Stock Shrinkage in Small Firms

By GEORGE C. WEBSTER

President
George C. Webster and Associates, Inc.
Washington, D.C.

Stock shrinkage is one of the major problems in both small retail stores and wholesale houses today. And, in the opinion of some experts, the problem is still on the increase. According to numerous observers, losses to business from employee dishonesty in a single year amounted to half a billion dollars!

Shocking as this disclosure may be, you need not assume from this that the trouble cannot be licked. It can be. But if you let your vigilance relax, dishonest people from inside and outside your firm can carry off sufficient loot to make you end up in bankruptcy court. And there is little reason to assume that you can't fight pilferers and their more daring cousins-in-crime, the embezzlers. But before talking of counter-measures, an understanding of what stock shrinkage is—and what causes it—is necessary.

Spoilage and Damage. Most owners and operators of small stores and wholesale houses are aware of this type of inventory-reducer. Goods that spoil, merchandise damaged through carelessness or by accident, are everyday occurrences in business.

Errors in Records. Some "shrinkages" are simply the result of faulty records and bookkeeping. Someone forgets to add newly arrived merchandise. Result: a shortage on the written record. Someone forgets to take items that have been sold off inventory records. Result: an "overage" in written records, and an apparent shrinkage in actual inventory.

Errors in Storage. If you are used to seeing certain types of goods in certain areas of your stock room, any misplacement of such items may cause you to assume that shrinkage has occurred.

Pilfering and Embezzlement. The above real and imaginary "shrinkages" are unpleasant facts-of-business. But they probably are a minor irritation compared to criminal pilfering and embezzlement. Some experts contend that the largest amount of real inventory shrinkage is due to people who simply walk off with merchandise. Some of these people are employees, others customers. In the opinion of more than one small business proprietor, customers who walk off with unpaid-for goods are a particular headache for many small retail establishments.

Obviously, such people—be they employees or customers—are in the minority. But even so, they create a problem for small business, and this Aid is designed to show some of the preventive measures that can be taken against such light-fingered, light-principled people.

Employee Relations Affect Shrinkage

Since most people are honest, is there any real cause for concern? The answer is yes. Even the most honest customer, the most trusted employee, may find temptation too much for him. To some degree at least, it's up to you to help your employees stay honest. How can you do it?

Well, suppose that a shrinkage occurs in your organization. First, make sure it is real and not the result of errors in records or storage. Once you are certain of its criminal origin, you might acquaint your employees with the facts. Of course, you run a certain risk: The thief may be listening to you! But, realizing that you are alert to inventory reductions, he may not dare to rob you again. And your other employees will appreciate your confidence in them.

Be Your Employee's Friend. One good way of keeping people on your

side, and cutting down on the temptation to steal, is to show them that you think of them as human beings with problems of their own. You might consider following the example of many small business enterprises which sell to employees at cost the products they handle. This approach may well save more than it costs. So may the following: (1) Offer your employees damaged or irregular merchandise at low prices. Pilferers often rationalize that such items "are no good to the company anyway." (2) Try to help employees who have financial problems. You will improve their morale, and help to prevent "temptation."

Set an Example. Above all, practice what you preach. If you want others to respect your property, you must show an equal respect for it. Treat company property as if it were a trust. Remember: Your employees are watching you. If they see you "slip," they will find little reason for remaining upright themselves.

Causes of Theft

Before discussing methods of controlling and combatting stock shrinkage in small retail stores and wholesale houses, it may be well to point out some of the causes of thievery. Understanding the reasons may help you to prevent at least some potential losses in your enterprise.

Warped Reasoning. The individual's "reason" for taking other people's property will vary, of course. Some men react to momentary temptations: They see a piece of merchandise, they want it and, if they believe themselves unwatched, will carry it off. Other people steal in response to pressing needs, or what they consider pressing needs. Thus in times of high living costs and high taxes, some people find themselves continually in financial difficulties. Others take what is not theirs to satisfy unconscious psychic urges.

Typical Thief. And don't rely on intuition to tell you who is a thief and who an honest man. The profile of the thief is neatly summed up in a statement by the Surety Association of America, which pictures him like this: "The average embezzler is about 36 years of age, married, with two children, having served the present employer about 5 years with apparent honesty and diligence, and earning a comfortable living wage. There is nothing about the picture to set the average embezzler apart from the average man or woman. Yet one or more of the following causes of stealing motivate him: Gambling extravagant living standards, unusual family expenses, undesirable associates, inadequate income, resentment or revenge."

This is the "composite thief" you have to guard against. In practice, how do you do it?

How to Reduce Shrinkage

One way in which you, as a small retail store or wholesale house owner or operator, can guard against

potential crooks in your midst, is by a process of careful hiring. When you interview a prospective employee, listen closely and watch for inconsistencies in his story. Even if it sounds plausible, be sure to: (1) ask him if he has ever been bonded and by whom, and (2) have him explain unaccounted-for periods of time in his employment record. (Chances are he'll be able to explain them to your satisfaction.)

Investigate Applicant. Above all, investigate his past employment records carefully, particularly if you may want to consider him for a position of trust in the future. Of course, few small retail store or wholesale house proprietors have the time or resources to undertake long, costly, FBI-like investigations into prospective employees' backgrounds. But something can be done:

(1) Check references. Be sure they are genuine.

(2) Call former supervisors and employers.

(3) If the person comes to you recommended by a friend, a business associate, or a fellow employee, talk to the source of the recommendation before hiring the applicant.

(4) If the applicant's references are too few or not definite enough, you might do one of several things: check with his wife's (or her husband's) employer; talk to an officer in his bank; check with former teachers, or with the doctor or clergyman.

But don't let this list frighten you. It doesn't mean that each time you interview a job applicant, you are talking to a potential crook. Far from it. Most people are honest, and the law of averages is certainly in your favor when it comes to hiring people. But as a practical, sensible businessman you can't afford to be gullible . . . and to turn your shop over to pilferers. And if you think that "prying" into an employee's background is unnecessary and even vulgar, you might like to hear about the unfortunate experience of a fellow small retail store operator who neglected to do some prying.

Into his office one morning walked a certain John Jones (name disguised), a neat-looking, intelligent job applicant liberally supplied with excellent references. The employer liked him at first sight, and the high praise of friends and former employers clinched his decision to hire Jones.

For a while, all went well. Jones was a "model employee." He worked hard, grasped the essentials of his job quickly. The employer was happy. Until, that is, the day Jones failed to show up for work. The next day, and the day after that, no word was received from Jones. On a sudden hunch, the employer checked the stock. Numerous—and expensive—items were missing. When the police caught up with Jones, they found that he had stolen not only the missing goods, but even his name.

This is how he had worked it: He had advertised for a bookkeeper in a newspaper, using a box number. Of

those who answered the ad, a certain John Jones had the most promising references: That was good enough for our thief. Armed with these references and his newly-adopted name, he applied for and got the job he wanted. And all because the employer had neglected to take certain safeguards!

So much about the hiring process. What about those men and women who have worked for you for some time, and those whom you call your trusted employees? You may feel here is a hopeless situation. But something can be done.

Check Up on Employees. Don't let temptation trip your trusted employees. If you suspect any one of your employees—even the most trusted one—of theft, check up on him on his day off or while he is taking a vacation. If you don't, you might be in for the same surprise as was the owner of one small wholesale house who became suspicious about the state of his stock.

One day, when the man in charge of the storage area—an old and trusted employee—was ill, the owner himself went into the carton-filled room to look for some merchandise. Imagine his surprise when he opened carton after carton only to find it empty! In all, 80 percent of his stock was missing!

Tighten Up Records. A small retail store salesman added considerably to his spending money by writing out sales slips after waiting on customers. After the customer left the store, the enterprising crook threw away the sales ticket and pocketed the money the customer had paid for the merchandise. Result: a shrinkage in inventory . . . and store income. What can you do?

(1) As a starter, pre-number all sales slips.

(2) Next, pre-number all checks, and always keep them in a safe place.

(3) Finally, pre-number all purchase orders. Be careful whom you let handle purchase orders, and whom you permit to okay them. Even then they should be checked against receiving tickets to make certain that the merchandise was actually received.

Watch that Stock! A prime condition for an adequate inventory policy is a safe, sensible method of control. Thus, be sure that your firm's accounting and record keeping procedures are so thorough that with their aid you can quickly spot and pin point stock shrinkage.

"Perpetual" inventory records, for example, will help you spot discrepancies quickly. They hold up a constant mirror to your inventory, enable you to spot losses quickly when checked against physical inventory. Moreover, you can use them as a check on high-priced, valuable, and small, easy-to-steal items.

Don't Let Enough Be Enough. But even the perpetual inventory is not enough protection against thievery. Make constant spot checks throughout the year—and let them come as a surprise. One small wholesaler who thought that perpetual inventories offered sufficient protection against stock shrinkage and pilferage, found at year's end that his book figure of stock was off by many thousands of dollars. Yet his perpetual inventory figures agreed with the number of items in his storage area.

An investigator soon solved the puzzle. He watched as an employee entered the firm's premises at night, removed three refrigerators, then carefully dropped three units from the perpetual record. The thief, in other words, made sure that the physical inventory and the book inventory checked perfectly. Perfectly for him, that is.

Are such thefts difficult to detect? Yes, but something can be done.

SUMMARY

Stock shortages cause havoc in small retail stores and wholesale houses, yet many owners and operators of such small firms fail to wake up to a perilous problem which, if left uncontrolled, can drive some of them into bankruptcy.

This Aid puts the spotlight on the sources of stock shortages, both non-criminal and criminal. Among the former are (1) spoilage and damage; (2) errors in records, and (3) errors in storage. Among the latter are (1) customer pilfering, and (2) employee thefts.

But be it non-criminal or criminal in origin, the stock shortage problem demands your attention. Something can be done about it, and this Aid shows some of the methods of controlling or, at least, considerably reducing it.

Control devices include (1) a new look at employer-employee relationships; (2) tightening up of records, and (3) a more thorough investigation of job applicants. (Published with the cooperation of the Small Business Administration.)

(1) Keep your inventory periods short.

(2) Be constantly alert to unusual work hours by employees.

(3) Compare stock shrinkages in your firm with trade association figures relating to inventory reductions in comparable enterprises.

Watch That Overage. Although he had a very tight inventory control, a certain dealer was "losing" a good many small, expensive items every week. How could it happen? The goods were tightly locked up, and each order sent out for delivery was carefully checked by himself or his wife. For a while he paid little attention to the fact that he seemed to have a fairly constant surplus supply of other, less expensive items. Finally he got suspicious, and hired an investigator.

The detective found that one of the porters working for the dealer often had a friend call for merchandise. On receipt of the order, the porter then opened a carton of low-priced items with a razor, removed most of them, replacing them with the luxury merchandise. The checker, of course, only glanced at the label on the carton, which appeared to be tightly sealed.

Thus, in effect, the dealer had a constant underage of high-priced goods and an equally constant overage of less expensive items.

How can you control or reduce the overage hazard? Try these steps: (1) If you discover an overage make an immediate book and physical inventory check. If it fails to find the source of overage, (2) tell your employees that you are aware of the existence of overage. Sure, the crook will be listening. But if he discovers that you are alert to such schemes, he'll hesitate to commit similar crimes in the future.

Watch Those Shipping and Receiving Procedures. Both your inventory and shipping-receiving control methods should mesh. Where one control area ends, the other must start. Tight controls will help prevent stock shrinkage and put an invisible but nonetheless real "Crooks Beware" sign at your door. Here are some specific suggestions:

(1) Check your truck periodically after merchandise has been loaded to make certain that the manifest agrees with the merchandise on the truck.

(2) Give strict orders to stockroom personnel to keep other employees or drivers from filling their own orders.

(3) Insist that the shipping clerk get a driver's receipt for every item that leaves the warehouse.

(4) Watch your trucks during and

just after loading . . . and before they leave your shipping area.

Be Alert to "Receiving" Trouble. Incoming merchandise must be watched carefully . . . as must outgoing goods. Thus you have to pay close attention to your receiving as well as your shipping procedures. Try to:

(1) Make sure that the person who orders merchandise—and the employee who receives the shipment—are different people.

(2) When possible, the employee who pays the bills for incoming merchandise should be somebody other than either the person who ordered it or who actually received the shipment.

(3) Give the receiving clerk a copy of the purchase order, to make sure that you are not being over-shipped.

Keep Them from "Taking" You. Against assorted crooks with assorted schemes, is there any defense? Yes. There is no royal road to safety against theft. But, again, something can be done about it:

(1) Make sure building and stockroom doors are strong and securely locked.

(2) Number your keys; and keep an accurate, up-to-date list of all employees who have office or storeroom keys.

(3) If you own either a small wholesale house or a small retail store, be sure to keep valuable goods under lock and key, particularly at night and over week-ends.

(4) Insist that your employees keep your place of business looking neat. Order and organization ease the task of visually keeping track of inventory.

(5) Neatness, too, is the key word for storage rooms. So are adequate space and facilities for storing merchandise.

Guard Against Customer-Pilfering. Even if you have taken all precautions against shrinkages resulting from causes discussed in this Aid, there is still one more shrinkage-inducer to watch out for: the customer. Some of the following suggestions may help here.

(1) Keep an eye on customers—and train your employees to do the same.

(2) Pay attention to customers wearing large coats or carrying umbrellas—two favorite "storing" devices of retail store thieves.

(3) Store small, expensive items in glass cases, or any place where customers can see—but cannot handle—them.

(4) Install mirrors high up on the walls. They will ease the problem of watching customers . . . and they may impress thieves with the fact that you are on the alert for trouble.

COMPLETE

(Continued from page 9)

the men busy elsewhere when they are not occupied with fertilizer work.

"By handling every step of the job ourselves, we are able to coordinate the operation and eliminate much waste time which the customer would pay for if he did the work himself. We know exactly when a truck-load of fertilizer will be on a specific customer's farm, and we do not send the men out to unload it and load the plane until the plane is ready. Because we hire the plane, we know exactly when it will be ready, and thus every step in the job coordinates and reduces cost by elimination of waste time," Mr. Wells stated.

The company does not own any planes, but Mr. Wells has several dusters working with him on a flat-rate basis. The fixed charge for each job is on the basis of a specific price per 100 lb. of fertilizer distributed. Mr. Wells knows what that fee is in advance, so that he is safe in pricing the complete job on a flat-rate basis.

The company has been able to reduce the cost of handling large orders by adapting the use of a fork-lift truck and pallets in storing fertilizer and for loading it onto trucks for delivery to the farm.

Pallets are of frame construction, built by the company at a cost of \$2.50 each. Each is 48 in. wide and 63 in. long, composed of a series of 1 in. by 4 in. rough planks, with two such "beds" divided by two-by-four timbers to each pallet. The safe carrying capacity of a pallet is about 2,500 lb.

All field fertilizer is hauled by company trucks from a plant in Houston. When a driver goes to Houston for a load, he hauls the necessary pallets. There, the plant workmen load the pallets according to Mr. Wells' standing instructions for the various fertilizers hauled. The bags are so staggered in the loading that it is not necessary to tie them onto the pallet for loading onto the truck or hauling to Garwood.

When the truck reaches the company's warehouse, one workman with a light fork-lift truck unloads the truck and stacks the pallets one on the other. When an order is to be filled, the fork-lift operator lifts the loaded pallets from the stacks in the warehouse onto the delivery truck.

Mr. Wells declares that one man with a fork-lift can unload or load a truck quicker than eight laborers formerly did it. "Actually, one truck-load hauled from the plant to our warehouse and unloaded saved enough in labor handling costs to more than pay for the pallets used."

Trade Winds From California

HAYWARD, CAL.—The Hayward Pet & Garden Supply has been opened at 22658 Main St., Hayward, by Jean N. Wayne and Vivian L. Luerding, offering various packaged chemical products for home use.

STRATHMORE, CAL.—The Growers Aerial Service has been incorporated at Strathmore, offering an aerial crop dusting service. Principal stockholders in the firm include Robert Sellers, D. R. Sellers and Lella Sellers.

DINUBA, CAL.—The Grayco Agricultural Chemical Service, Inc., will sell chemicals and other farm supplies through the Alta Hardware and Farm Supply Store, at 149 West Tulare St., Dinuba.

NOVATO, CAL.—Vito R. Bertoldo has given his first name to a new retail nursery store opened on Highway 101 at the Blackpoint Cutoff near Novato. He sells agricultural chemicals.

WATSONVILLE, CAL.—Cesare De Rose and his son, Robert De Rose, have opened a new nursery and farm supply store on the Salinas Highway south of Watsonville. The name of the new enterprise is De Rose & Son Nursery.

APTOS, CAL.—The Beth-Mar Gardens Nursery at 9085 Soquel Drive, Aptos, has been sold to Carolyn Keturakat by its former owners, who were Edward P. Wilson, Elizabeth Wilson and Hugh M. Keturakat.

PARADISE, CAL.—Paradise Gardens is the name of a new nursery wholesaling agricultural chemicals and related items at 836 Roe Road. William L. Dreyer is the owner.

SACRAMENTO, CAL.—The Nu-Life Crop Service, Inc., has been incorporated in Sacramento with a capitalization of \$50,000 for the purpose of manufacturing fertilizers. Principals of the new concern are Gordon W. Wooden of Marysville, and Clyde A. Blanpea.

EUREKA, CAL.—Barney T. Skidmore is now selling agricultural chemicals and other garden and farm supplies from a new location at Donna Drive and Worthington St. in the lumbering center of Eureka.

OLEMA, CAL.—Werner and Dorothy M. Tobler and Sherwood Frische are now operating the West Marin Nursery on Sir Francis Drake Highway, where they retail chemicals for farm and garden use.

PALERMO, CAL.—A new farm chemical retail establishment is expected to be opened soon on Gibraltar Ave., in Palermo by Oma H. Harris as the Palermo Ranch Market, offering farm and garden supplies.

FRESNO, CAL.—A new crop dusting firm has been opened in Fresno under the name of Amco Helicopters, Inc. With a capital of \$70,000, the firm's principal owners are listed as H. E. and Pearl N. Gribble, and Donald C. Harper.

Air-Borne Leaflets, Free Movies Bring Quick Business to Dusting Contractor

Crop dusting companies are often faced with the problem of expanding their sales area. Jim Walker, owner of the Walker Chemical Co., at Odem, Texas, has devised a couple of methods to gain a welcome in a new area.

When he moved his planes to Stanton, Texas, for the cotton growing season, here is how he made an entrance: While the city was jammed with oldtimers for an early day settlers' reunion, Mr. Walker sent two of his planes circling the city, dropping multi-colored leaflets. These leaflets showered the crowd, and every farmer there read about the Walker Chemical Co., its planes which were especially designed for slow speed for better crop dusting and gave the company's address in the west part of town.

Mr. Walker followed up this grand entrance by meeting as many cotton growers as possible. He carried a

movie projector, screen and a special film with him and showed it dozens of times the next few weeks.

This film was in color and showed the Walker planes and equipment. Farmers could see how the pilots maneuvered the planes, how close to the ground they flew and the dense spray that covered the cotton. It also showed insect infestations and for 15 minutes gave the viewer an informative, entertaining lesson about cotton insect control.

Mr. and Mrs. Walker rented rooms in a motel next to the city's largest restaurant. This restaurant was a gathering place for cotton growers, so Mr. Walker often would bring a group of four or five to the rooms to see the film.

"We soon had all the acreage we could handle," he said, "but the repeat business comes from doing a good job and in knowing insects and

the chemicals needed to kill them."

Mr. Walker was an Air Force pilot during World War II, but he spent much time learning entomology. His wife also has studied with him, until either one can inspect a field and determine the correct time to treat it.

After about three months in the Stanton area, the Walkers leave until the next spring. They spray cotton and vegetables in south Texas and usually do a stint of several weeks down in Nicaragua.

"A fellow in business and moving around as much as a crop duster should devise some method of breaking into a new area," said Mr. Walker. "Thus far I've found the leaflets and movie film will reduce this static, get-acquainted period by several weeks. Now when we hit a new county, we usually have all the business we can handle within a couple of weeks."

FARM SERVICE DATA

EXTENSION SERVICE REPORTS

The insect causing pine needle scale is easiest to control in late May or early June (about the time lilacs bloom).

This is a good time to spray for this insect which attacks pine and spruce, says Wayne J. Colberg, North Dakota Agricultural College extension entomologist. The insect is just emerging from the egg as a reddish colored crawler and will feed for a short time before it settles down and secretes a whitish scale about its body.

Once established, pine needle scale causes the needles to turn somewhat yellow. Attached to the needles are whitish scales up to 1/4 in. long.

For control, 2 teaspoonfuls of 57% malathion emulsion in 1 gal. of water sprayed on the trees is recommended. A second application about 10 days later to kill the young scales which might be a little late in hatching, is a good follow up, Mr. Colberg said.

★

The start of the spring grazing season is also the time of year when poisonous plants show up and grow faster than the grass. That's when cases of livestock poisoning are also likely to appear. Ordinarily livestock will not eat poisonous plants and when they do it is often because ranges are overstocked or the animals are turned out too early or they are being trailed through an area where poisonous plant growth is very heavy.

Prevention is still the best means of avoiding losses from poisonous

plants. Some of the steps that can be taken are these: First, prevention of overgrazing and overstocking of the range; second, recognition of poisoning and prompt movement of stock to safer range; and, third, recognition of poisonous plants and avoidance of them when they occur on pasturage.

One of the most common poisonous plants and also the most deadly is death camas. It is especially deadly to sheep, but cattle are occasionally poisoned. The best way to avoid losses from death camas is to avoid early spring pasturing where ranges are heavily infested with it.

Tall larkspur is another dangerous plant and is often the cause of cattle losses in early spring. After the plant blossoms the leaves lose their poisonous properties and the plant is less dangerous.

Other poisonous plants are water hemlock which grows along water courses, and the lupines which are especially dangerous for sheep.

For more information, a copy of the Montana Agricultural Experiment Station bulletin entitled "Range Plants Poisonous to Livestock in Montana," is available at the county extension office.

★

Use of in-the-furrow fungicides at planting time may be an effective aid for controlling cotton seedling disease in some areas, says Harlan Smith, extension plant pathologist.

Cotton seedling disease is one of the major diseases attacking cotton in Texas, Mr. Smith pointed out. Last

REPUTATION

(Continued from page 9)

cides and other farm chemicals are promoted by making heavy use of the promotional literature made available to this center by the manufacturers. Regardless of what a customer may purchase in a store, some of this material is wrapped with the purchase so that it gets into the customer's home. This helps to familiarize the customer with the particular products and is also the basis for their asking for the particular product when it is needed.

The three year old center is located a few hundred feet off the main highway so that motorists can drive up to the front of the building and park. This arrangement has stimulated a lot of traffic to the store and, in order to handle the increased customer turnover, a self-service arrangement has been set up.

All merchandise, whether displayed on the floor or gondolas, form aisles so that customers can tour the entire building with ease. Heavy equipment, such as lawn mowers and related items are displayed on the floor as are the larger size bags of fertilizer, peat moss and related farm chemicals. Packaged items, such as seeds, garden supplies, insecticides and other garden or crop raising materials are displayed on gondola fixtures. This makes it easy for the shoppers to select any of the items they want and, if they desire personal attention, they just motion to a store clerk. All purchases are brought over to the register counter where they are wrapped and checked out.

"Everyone is familiar with supermarket shopping today and by fol-

lowing this type of store layout, we have been able to introduce new traffic to our store and also to sell more merchandise," explains Mrs. Beer. "Of course we give personal attention to customers when they want power equipment or desire personal information about fertilizer or insecticides. Our self-service arrangement makes it possible to have a great many customers in our store at one time and to provide the personal attention when it is necessary with only two or three sales personnel. If this wasn't the arrangement, we would have to have twice as much help and this would naturally cut into our profit picture."

Mrs. Beer explains that the average customer today is a multiple purchasing potential who is continually in need of seed, equipment and chemicals. The store that gains the reputation of being a specialty outlet for this type of merchandise stands the best chance of doing business with them. By concentrating on brand name merchandise, helping a customer to raise a healthier lawn, garden or backyard crops they go a long way in the continuity of selling to these customers.

Other than an occasional newspaper ad when the store has something special to offer, the center finds that its quarter page in the local telephone directory covering the area from which the Home Lawn & Garden Center draws its traffic does a highly satisfactory job. The directory helps to introduce newcomers in the area to this center and also stimulates telephone inquiries.

FERTILIZER CREDITED FOR CROP INCREASE

DOUGLAS, GA.—The soil fertility program carried out in Coffee County, Ga. in 1958 contributed \$625,000 more to the county's corn crop last year, Larry Torrance, county agent, reported.

The estimate is supported by official yields released recently by the Georgia Crop Reporting Service on the 1958 corn crop.

In 1957 the average corn yield in the county was 25.5 bu. an acre, and a record 36 bu. an acre in 1958, or an increase of 10.5 bu. an acre in one year. Weather conditions were similar both years, therefore credit for the increase is given to better fertilization.

The 10.5 bu. increase is valued at \$13.12 an acre, and the increased amount of fertilizer used to produce this was \$3.10 an acre. This leaves an increased value of \$10.02 an acre for the entire crop, or a gross return of \$4 for every dollar spent on extra fertilizer.

A net increase of \$10 per acre on the 62,500 acres devoted to corn last year in Coffee County gave a net increase of \$625,000 on the 1958 corn crop over 1957.

year it cost Texas farmers a little over \$4.5 million.

Information concerning use of in-the-furrow fungicides at planting time, a relatively new seedling disease control practice, was first published by the Texas Agricultural Experiment Station in January of 1958. About 400 Texas producers used the practice on a total of 26,523 acres last year.

Most of the treated acreage was centered in the High Plains and Lower Rio Grande Valley, Mr. Smith explained. However, there were small tests in several other areas. A Wharton County grower tried it on 50 acres and obtained quite favorable results.

★

Control of mesquite has dropped off in the last five or six years, said G. O. Hoffman and B. J. Ragsdale, Texas A&M extension range specialists. Drouth, they added, has been a major factor.

In 1951 and 1952 over a million acres were treated. But the late and dry springs of these years resulted in very little total kill of mesquite. In 1957, the specialists said, only 20,000 acres were treated, but in 1958 the acreage treated more than tripled.

Mesquite is moving east and is taking over a lot of abandoned cultivated land. It is an aggressive, persistent plant on some 75 million acres of grazing land in the Southwest, the specialists said.

★

Safflower should be planted on deep, well drained, fertile soil for best results.

That's what tests at the University of Nebraska Scottsbluff Experiment Station indicate.

In experiments to date, safflower has given no response to nitrogen when planted on a fertile soil. However, on soils very low in fertility, safflower probably would respond to fertilizer, reports Cliff Ashburn, extension farm management specialist at the station.

These findings were obtained in tests carried out under irrigated and dryland conditions where rates of 60 and 100 lb. of nitrogen were applied per acre.

Where safflower was irrigated, disease problems have been more of a limiting factor than fertility.

California agronomists suggest planting safflower on good fertile soil. Where soils are low in plant nutrients, it is recommended to use commercial fertilizer.

★

More midwestern farmers are adopting the new wheel track method of planting corn on freshly plowed ground without harrowing or disking, according to reports by midwestern agronomists and agricultural engineers.

This new method enables farmers to save considerable time, labor, fuel and machinery costs, the col-

lege specialists say. At the same time, yields are just as high or higher than by using conventional tillage methods.

With the wheel track system, the farmer goes over his field only twice to get the corn planted—once with the plow and once with the planter. The seed is planted in the tractor wheel track immediately after plowing. With conventional methods, farmers plow and then work the soil several times before planting.

Dr. Arthur E. Peterson, University of Wisconsin extension soils specialist, reports that the corn acreage planted by the wheel track method doubled in 1958. This method, he says, encourages rapid sprouting and helps cut down losses from soil erosion.

Dr. Peterson says fertilizer can be drilled at planting time. Equipment is now available for putting the plant food in a band 2 in. to the side and 1 in. below the seed level.

Clarence Hansen, Michigan State University agricultural engineer, reports yields were nearly 11 bu. higher an acre by planting corn in a single operation than when conventional tillage was used in a Michigan test.

An Ohio agronomist, John A. Slipher, says minimum tillage cuts down soil compaction, conserves soil and moisture, encourages root development and promotes more uniform corn germination.

George R. Blake, University of Minnesota research specialist, says wheel track planting could be the answer to soil compaction resulting from too much disking. Yields on uncompacted soil averaged \$4.4 bu. an acre, compared to 77 bu. on land packed down from too much disking.

★

Farmers can make the most profits from their investment in fertilizer, by adding plant food according to the amount of capital they have available, reports Dr. Ermond H. Hartmans, University of Minnesota agricultural economist.

"If a farmer has unlimited capital, or can obtain unlimited capital through credit institutions, he should try to obtain the highest net return per acre," says Mr. Hartmans, in a statement summarized here by the midwest division of the National Plant Food Institute. "Here the last dollar invested in fertilizer would give him a return equal to his investment."

"If a farmer has a partially limited amount of capital, he should invest his money to the point where the return for the last dollar spent on fertilizer gives him as high an income as the investments he makes elsewhere in his business."

"A farmer with an extremely limited amount of capital should put money into fertilizers so that he gets the highest possible return per dollar invested."

Mr. Hartmans says that the cost of fertilizer is very favorable compared to the rising trend in the cost of other items the farmer uses in crop production.

"In fact," he says, "fertilizer might well be one of the best investments a farmer can make today."

SCHOENFELD AND MCGILLICUDDY



OSCAR & PAT

By AL P. NELSON
Croplife Special Writer

There was the sound of automobiles outside the farm supply store and two tall, hatless and well dressed salesmen came into the store. Noting plump Tillie Mason at the typewriter, one of the salesmen flashed his wide smile. "Hello . . . there! Is Pat McGillicuddy around?"

Tillie beamed under this male attention. "No, he isn't down yet," she said, "but his partner Oscar Schoenfeld is." She indicated balding, pot bellied Oscar who was pursuing a set of figures as intensively as an electronic calculator.

"Man," grinned the young salesman to his partner, "this must be a better business than the auto racket. The boss here gets down later than we do in our business."

Oscar swung around on his swivel. "I am one of the bosses around here," he said. "And I get to work at 6:45 every day. It's—it's only that Irish partner of mine who never comes in the same time."

"Oh," said the young salesman. "Well, if you are one of the partners, then we won't have to wait for McGillicuddy. Mike Sherkett, our boss, told us to drive these two station wagons down here and leave them for McGillicuddy."

Oscar paled. "Two station wagons!" he exclaimed. "Ach, we didn't order anything like that. And if Pat ordered them for his family, I don't see how he can ever pay for them. He owes plenty to lots of people."

"We're not trying to sell them to him," the young salesman said, with his courteous sales manner. "McGillicuddy and Sherkett have worked out some sales promotion stunt between them, and they want to use the wagons. The boss said just to bring them here and leave them for McGillicuddy. Here are the keys." He held out two sets of keys for Oscar.

"Take them back! Take them back!" Oscar was furious. "Another sales promotion. Himmel, we can't make any money on sales promotions. They only bring in the dead-beats, and we got too many of them. We only want good customers, them that can pay cash. Everything I buy, I pay cash for. And I got lots of money in the bank, too."

The two salesmen exchanged significant glances. "You have!" exclaimed the younger. "Say, why don't you come out and took a look at one of our wagons? One's a crackerjack: champagne color. You'd look mighty prosperous driving down the street with that, Mister." He pulled a book out of his pocket. "Say, what kind of car do you drive now? We'll make you a big allowance."

Oscar drew himself up proudly. "Ach, it's a 1939 Chevrolet—and runs like new, too."

The salesman blinked, then smiled weakly. "Really? Are you kidding me?"

"I am not," Oscar snapped. "Take your wagons home. We don't want them. If more people would run their cars longer like me and my wife, they would have lots more money and could face old age without nervous breakdowns."

"If everybody kept their 1939 cars," said the salesman slowly, "there wouldn't be any jobs for fellows like Harry and me."

"I can't help that," Oscar said. "I haf to look out for myself, not you. I don't want your keys. Rouse mit your foolishness. I got work to do."

The young salesman took the two

sets of keys, shrugged his shoulders and glanced at his flabbergasted friend. "Maybe we got the wrong place," he said hopefully, walking toward Tillie. "Is there another McGillicuddy in the farm supply business?"

Tillie shook her head. "No, this is the place," she said.

The door opened at this moment and Pat McGillicuddy came in, hatless, and the tails of his grey raincoat flapping. "Oh, hello, boys," he said, noting the keys in one of the salesman's hands. "Those our station wagons?"

"I thought they were," the salesman said, "but that fellow says nix."

Pat smiled and took the keys. "Oh, Oscar and I argue about everything we do. Keeps both of us on the ball,

so that neither gets away with anything. Thank Mike for me. Soon's we get the promotion lined up, I'll call him."

After the two salesmen had gone, Oscar swung around in his swivel chair again. "McGillicuddy, have you gone crazy? Now you're buyink cars. For who—you or the business?"

"Neither," Pat said, sitting down at his desk and playing with the shining sets of keys. "This is a promotional idea. The cars go back to Sherkett at the end of three days."

"Take them back right away," Oscar said. "He'll charge you some way. I know him. He skinned Minnie's cousin on a car deal."

Pat sighed. "Don't be suspicious of everybody, Oscar. I had to talk fast even to get Mike in on this



By Emmet J. Hoffman
Croplife Marketing Editor

OVER THE COUNTER

One way a farm supply dealer can determine the sales potential for one particular product line he handles is to find out the average expenditure per acre for that item and multiply this figure by the total number of tillable farm acres in his trade area.

Let's use an example. Suppose that it has been determined that the average yearly expenditure for fertilizer in the dealer's area is \$3.00 per acre. Suppose further that there are 400 farms averaging 200 acres each in the dealer's trade area. This means that on a total of 80,000 acres in the dealer's trade area, a total of \$240,000 (80,000 x \$3.00) is spent annually for fertilizer.

Then it's up to the dealer to decide whether he is getting his fair share of that \$240,000 retail fertilizer business.

The dealer can apply the same technique to other products and services such as feed, seed, farm chemicals, custom applying, lime and phosphate, chicks and seed treatment.

The most difficult chore—but most important—is to determine the average expenditures per acre for various products. Often the county agent can provide such estimates. The state university, the extension service, the chamber of commerce, or the farm representative of a bank may also be asked for estimates. Usually it is not too difficult to ascertain the average farm size and the number of farms in the dealer's trade area.

A technique similar to this is often applied in the retail hardware and dry goods merchandising fields, as well as in others. In these cases, however, per capita expenditures are usually used but for farm expenditures, the "per acre" method is more realistic.

An actual example of how the "per acre" expenditure technique is applied to Illinois farms follows. The figures used are those supplied by D. F. Wilkin, farmer management specialist, college of agriculture, University of Illinois. The figures were part of a larger study he made on changes in farmer buying. The study included a summary of actual cash expenditures on 801 northern Illinois farms and 307 southern Illinois farms.

The study showed that the cash expenditures per tillable acre declined as the size of the farm increased. The total investment on an average 240-acre northern Illinois farm exceeds \$125,000.

The accompanying table—adapted

from the Wilkin study—will enable an Illinois dealer to determine quite closely what his potential market is for feed, fertilizer, lime and phosphate, and—with some projected estimates—for a number of other main lines.

Let's determine the fertilizer sales potential for a dealer in northern Illinois. The "per acre" expenditure is \$3.24. He has 400 farmers in his trade area, averaging 228 tillable acres per farm. The dealer has a market potential of 91,200 acres which—multiplied by \$3.24—means his dollar potential for fertilizer is \$295,488. Then, by allowing for his competition, he can determine if he is getting his fair share of the fertilizer business.

A similar procedure may be used by Illinois dealers for feed and other products listed. Dealers in other states will find that the average size of farms, "per acre" expenditures and the extent of their trade areas may vary. It is important that these three estimates be quite accurate so that the resultant sales potential estimate will be a reliable figure on which to base sales decisions.

	Northern Illinois	Southern Illinois
Number of farms	801	307
Acres in farms (average)	258	257
Tillable acres	228	213
Livestock (purchased)	\$14.72	\$ 8.53
Feed (purchased)	20.16	14.48
Cash operating expenses	34.46	27.75
Purchase of capital items	16.61	16.49
Total cash expense	\$85.95	\$67.25
Capital purchase of machinery	\$ 9.79	\$ 9.74
Machinery repairs and supplies	4.92	4.46
Machine hire	2.15	1.70
Gas and oil	4.12	3.86
Fertilizer (annual application)	3.24	3.86
Lime and phosphate	1.03	1.03
Livestock and miscellaneous expense	2.92	2.15
Total farm investment	\$13.00	\$10.00
Machinery and equipment investment	30.24	29.83

deal. I am going to fill those station wagons full of garden, farm and lawn merchandise—items like bags of fertilizer, bags of field and grass seeds, a garden tractor, power mower, and spray materials. Each item will be labeled with a neat sign. Nora's made them for me—free of charge."

"Foolishness!" barked Oscar. "What goot will that do? It will chust take time."

Pat chuckled. "Well, Oscar, we will park those two loaded station wagons at different places downtown on the streets, and in metered parking lots for three days. Farmers and townspeople will see them. Most people are curious. They'll look at the stuff in the station wagons, read by the signs it's our stuff and some will come over and buy. And the price of the station wagon and the name of the dealer will be on it also. That way, Mike may get some prospects, too."

Oscar blinked. "Ach, and who will drive those station wagons around, and spendt so much time watching the meters so you don't get pinched?"

Pat cleared his throat. "Why, I thought maybe you'd like to help me out, Oscar. You could drive one station wagon and I would drive the other. Between us we could park in about 10 good strategic spots per day. One of us could even take runs through the country and visit farm auctions."

"I will not," exploded Oscar. "Ach, you will not make a monkey out of me, McGillicuddy. Such foolishness I have never heardt. We haf a store here, Irisher. We got display shelves. We don't haf to haul schtuff aroundt in station wagons. Stay inside once in a while and do your work—like me. Then we get aheadt."

Pat shook his head. "You are you, and I am I, Oscar. We think differently."

"If I wouldt think like you I would go out and shoot myself!" Oscar snapped. "You don't even own a house . . . You rent! Why? Because you always spendt so much."

Pat's face got pale. He got to his feet. "Every man has a cross to bear!" he snapped. "I've got you to bear. And, begorra, you're worse than a cross. I'm going out for coffee!"

"Go aheadt and drink coffee and waste more time!" Oscar burst forth. "Be sure to get back before we close up—that's 5:30."

But Pat didn't hear him. He had slammed the door too hard.

Gloomicides

"You can't come in here, and ask for a raise just like that," said the boss. "You must work yourself up!"

"Work myself up," screamed the underling. "Can't you see that I'm trembling all over?"

★

"He: 'What's your uncle doing now?'"

She: "He's in Africa, hunting ant-eaters—he wants to bring one back alive."

He: "What on earth does he want one of those things for?"

She: "He hates my aunt."

★

"You've been paying your son's college expenses two years, Sam. Tell me, is education expensive nowadays?"

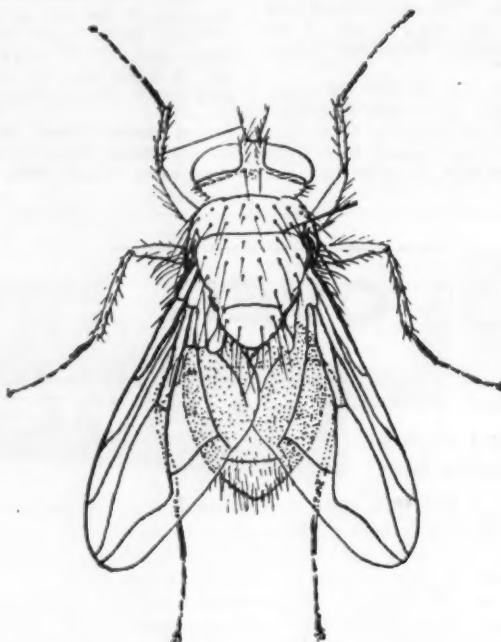
"Language runs the highest," replied Sam. "Last month it was \$10 for English, \$20 for French, and \$115 for Scotch."

★

Home-coming husband to wife: "Whew! I took an aptitude test this afternoon. Thank goodness I own the company!"

BUG OF THE WEEK

Mr. Dealer—Cut out this page for your bulletin board



Blow Fly

How to Identify

Blow flies, often called green bottle flies and blue bottle flies, are of many kinds. The "green bottle" fly is almost twice the size of the common housefly, and is a bluish-green color. Reflections of light give it a bronze appearance. The black blow fly is dark greenish color all over and is larger.

Habits of Blow Flies

Life cycles of blow flies are similar to that of the house fly. They breed mainly in the carcasses of dead animals and in meat in garbage. Although they are seldom so numerous as houseflies, they carry many of the same disease-producing organisms. The larvae of blow flies also develop in wounds or natural openings of the body. Some species, true parasites, develop in the tissue of living animals. The flies spend the winter in the larval or pupal stage in soil or in manure. After appearance in the early spring, the pests continue breeding throughout the summer unless this activity is checked by dry weather. A generation is completed in about 3 weeks, from egg to egg.

Damage Done by Blow Flies

These pests cause considerable losses to cattle, horses, hogs, sheep and goats. According

to USDA figures, blow flies cause an estimated annual loss to these animals of more than \$15 million. Chickens, too, can be affected by the fly, though indirectly. At times, fowl become ill and die from ingesting blow fly maggots that have developed in contaminated meat. The blow fly is also suspected of being a carrier of a number of human disease organisms.

Control of Blow Fly

An obvious means of control of these flies lies in sanitation, or removal of situations conducive to egg-laying and protection from cold weather. A number of insecticidal chemicals are effective in control. Recommendations for control materials, timing, application practices, dosages, etc., may vary widely in different states and sections of the country. It is therefore difficult here to attempt to give specific suggestions as to what materials should be used or how they should be applied. Local authorities such as county agents, state experiment station entomologists, and manufacturers of the various pesticides should be consulted for specific information. Labels on pesticide containers carry full instructions on use and dosages. Users should always be urged to study labels carefully before applying any insecticide on food or feed crops to avoid the risk of illegal residues at harvest time.



THOSE ATTENDING the planning meeting of the Southwestern Fertilizer Conference in Galveston, Texas, were (left to right): Stanley Hackett, Dixie Fertilizer Co., Shreveport; Stafford Baubouf, Grand River Chemical Division of John Deere & Co., Pryor, Okla.; Mrs. Hackett; Dr. J. F. Fudge, state chemist, Texas; Jimmy Powledge, National Hotels; Mrs. Fudge; Mrs. Doug Kelly; Doug Kelly, Monsanto Chemical Co., El Dorado, Texas; Mrs. N. D. Morgan, and Dr. N. D. Morgan, American Potash Institute, Shreveport.

Group Meets; Conference Program Outlined

GALVESTON, TEXAS—The planning committee of the Southwestern Fertilizer Conference and Grade Hearing met here recently to work out details for the group's annual conference to be held at the Galvez Hotel here, July 15-18.

The theme of the program, the committee said, will be to emphasize "The Weakest Link" of the fertilizer industry. A serious effort will be made to give all those attending some facts and figures to help upgrade the sales and profits of the industry, a spokesman said.

Fertilizer Helps Indiana Farmers Increase Profit

LAFAYETTE, IND.—Indiana farmers can increase profits from their cropping system by modernizing their rotation, using recommended amounts of fertilizer and improving cultural practices.

Paul R. Robbins and M. E. Juillera, Purdue University agricultural economists, and A. J. Ohlrogge, agronomist, drew these conclusions from a study of Indiana crop costs and returns.

The Purdue staff members collected data from 313 better-than-average northern Indiana farms representing different soil types. They found the following cropping trends:

These better-than-average farmers are planting more corn; they are applying more commercial nitrogen; meadow intercrops are tending to replace standover meadows; oats are making up a smaller percentage of the rotation; wheat is being substituted for oats whenever possible, and corn is being substituted for some soybeans.

The research disclosed that land charge for taxes and interest was the largest single cost of raising crops. Fertilizer was the second most costly item.

Variation in crop yields necessary to break even depended on owner-operator arrangements, soil differences and cultural practices; however, the break even points for most operators cooperating in the study were—corn after legume sod 40-50 bu. per acre, corn not after legume sod 45-55 bu., wheat 22-26 bu., oats 60-68 bu. and alfalfa mixtures 3-3½ tons.

OPEN HOUSE

NEW HAVEN, CONN.—Analytical chemists at the Connecticut Agricultural Experiment Station will explain the work of their laboratories to visitors at an open house June 9. All other departments at the research institution, 123 Huntington St., also plan exhibits and demonstrations of typical investigations.

Mississippi Delta Gets New Weather Service

MEMPHIS — Farmers and aerial applicators in the Mississippi Delta area now are being provided with a special agricultural weather service.

The Memphis Weather Bureau began an agricultural aviation weather summary and forecast May 20. The service is issued daily in the early evening, thus giving farmers and aerial applicators a last minute check in planning spraying, dusting and other operations for the following morning.

The information includes intensity and duration of dew, wind direction and velocity, precipitation intensity and duration, and clouds or fog that may affect use of aircraft in treating crops. The bureau is feeding the information into the Mississippi Delta weather teletype system and the Memphis Loop for use by radio and television stations.

The teletype system was established some months ago to distribute forecasts and other weather data developed by the pilot weather program now operating at Stoneville, Miss. Under the pilot program, ten local weather observation stations report daily during the growing season to the nearest weather bureau station. This information is used with that collected by the weather bureau to develop local agricultural weather forecasts.



BIGGER FERTILIZER TONNAGE SEEN FOR KANSAS—For the first time, fertilizer recommendations were given a prominent place on the program of the 62nd annual convention of the Kansas Grain & Feed Dealers Assn. held recently in Wichita. Zenas Beers, regional director, National Plant Food Institute, Chicago, spoke on "Your Farmers! What Sights Do They Set?" Bringing the Kansas dealers more specific information on what to recommend for their farmers was Dr. Floyd W. Smith, professor of soils, department of agronomy, Kansas State University. Dr. Smith predicted a possible increase in fertilizer use in Kansas of 50,000 tons for 1959. Discussing this outlook for increasing sales, from left to right, are Mr. Beers, Ivan Woolsoncroft, Centra (Kansas) Grain Co., and Dr. Smith.

Five Year Forest Research Program Aimed At Reducing Annual Loss to Pine Insects

SACRAMENTO — A five-year program of forest research aimed at reducing the multi-million dollar annual timber loss from the ravages of insects, principally pine beetles and borers, is underway in the North Star Experimental Forest near Grass Valley, Cal.

The program, sponsored by the Boyce Thompson Institute for Plant Research, Yonkers, N.Y., is directed by Dr. Jean Pierre Vite, a forest entomology major from the University of Goettingen, Germany.

The present stage of the experi-

ment is the determination of why trees are susceptible to beetle infestation. Dr. Vite said his research group started with the premise that the outbreaks usually occur in dry years.

The 720 timbered acres on which the experiments are being conducted include nearly all conditions under which trees grow. The Ponderosa pine, the most important tree in the West commercially, is the principal subject of the study.

"We are concentrating on the pine engraver beetle rather than the western pine beetle because the engraver attacks the young Ponderosa pines and kills them long before they are ready for harvest," Dr. Vite said.

He added that the western pine beetle prefers the mature or over-ripe trees.

"Because these mature Ponderosas are being harvested rapidly the western pine beetle is fast losing a place to reproduce. Hence, control to a degree is going on," he said.

"We fully realize the extent of his damage but the little tree top engraver we believe is the greatest present and future menace."

The research group, headquartered in abandoned mine assay offices, is concentrating on such factors as pitch flow speed and pressure.

Young test trees are injected with insecticides and repellents. The trees are then split and the course of the injections is studied. It has been established that liquids can be fed into the trees and will rise to the tops. The next step is to determine the proper insecticide to use against the engraver beetles.

Participating with Dr. Vite in the work are David Wood, a graduate of the University of California, and Thomas Gau, a Nevada City, Cal., forester.

Thompson Chemicals Acquires St. Louis Site for Expansion

ST. LOUIS—As the initial step in a major expansion program Thompson Chemicals Corp. has purchased a 5 acre plant site at Clarence Ave. and 3rd St., E., here. Ground will be broken in July for construction of the first structure of a four-unit plant, and is scheduled for operation Oct. 1, 1959.

Wm. T. Thompson, president of Thompson Chemicals Corp., which has production facilities and offices in both St. Louis and Los Angeles, announces that one unit of the new plant will be used to produce a new, patented grain control chemical for use in corn plantings.

USDA Issues Report On Insect Repellents

WASHINGTON — Insect-repellent properties of 534 experimental chemical compounds are described in a report issued by the U.S. Department of Agriculture.

Most of the compounds were synthesized by USDA's Agricultural Research Service and all were tested by the Agricultural Marketing Service for possible use in developing insect-resistant packages. Results of similar tests of other compounds will be published as the tests are completed.

A copy of the report, "Laboratory Evaluation of Promising Compounds as Repellents to Flour Beetles, Tribolium Species," Marketing Research Report No. 324, may be obtained from the Office of Information, U.S. Department of Agriculture, Washington 25, D.C.

CROPS-SOILS DAY

EAST LANSING, MICH.—Crops and soils research at Michigan State University goes on its annual display July 9 at Crops-Soils Field day.

ANTIBIOTIC

(Continued from page 1)

oil, is sprayed on the base of the infected tree where it penetrates the bark and enters the vascular system. It destroys the blister rust fungus without harming normal tree tissues.

This year the Forest Service will try aerial spraying of acti-dione. If successful, this method would be less costly than applying the chemical from the ground. Other current studies are directed at finding out how long antibiotics remain in the tree, the extent they immunize if at all and how much protection they give the pine against a new rust infection.

Experiments in the use of antibiotics to fight the white pine blister rust started about 1953. Since then the Forest Service, working with industry, has had spectacular results with acti-dione. To date work has been confined to areas where standard control measures have been used. These call for removal of currant and gooseberry bushes by hand or by chemicals.

The blister rust was accidentally introduced into North America from Europe some 60 years ago. Many millions of dollars have been spent combating the disease. Foresters hope antibiotics may also prove effective in fighting other tree diseases.

GRAIN DISEASE BULLETIN

COLLEGE STATION, TEXAS — Small grain losses due to diseases in the excessively wet seasons of 1957 and 1958 were estimated to be more than 20,000,000 bu. Damage to the crop may result in reduced stands, reduction in amount or quality of forage or in reduced yields and quality of the grain produced. Diseases which caused these losses are discussed in a bulletin released by the Texas Agricultural Experiment Station entitled "Diseases of Small Grains in Texas."

Effects of Water-Solubility of Phosphorus On Crop Yields Discussed by Agronomists

By Dr. R. P. Thomas

International Minerals & Chemical Corp.
Skokie, Ill.

PHOSPHORUS, one of the three main components of complete fertilizer mixtures, originates from bones. In the early days of fertilizer production it came from slaughter house bones and other organic sources. Now it comes almost wholly from prehistoric bones or phosphate deposits found in various parts of the world.

The low solubility of these mined phosphate rocks is corrected by treatment with acid. Superphosphates formed in this way have a high solubility in both water and citrate solutions, and are called "available phosphates." In this country the citrate method is the "official" or approved method of measuring the availability of fertilizer phosphates. This chemical method has been tested and verified by many thousands of plot and field experiments until the terms "available phosphorus" and superphosphate are used interchangeably.

In fertilizer manufacture, superphosphates are treated with ammonia and nitrogen solutions to form ammoniated superphosphates. This provides a more economical source of both phosphorus and nitrogen. In addition, ammoniated superphosphates contain many of the other needed plant foods originally found in the phosphate rock and acid such as calcium and sulfur. Many of the completely water-soluble phosphate fertilizers made from liquid phosphoric acid do not contain these needed plant foods. Ammoniated superphosphates usually stay available in a soil longer, since they do not combine as quickly with other needed nutrients, magnesium and minor elements, found in both a good fertilizer and the soil.

When phosphates are applied to the soil they react quickly with the fine soil particles. The form to which they change will depend upon soil conditions such as presence of lime and soil acidity, and the rate of change will depend upon a number of other factors such as soil texture, climate and organic matter content. Regardless of the forms in which phosphorus is applied to a soil, they are all eventually transformed into phosphate materials of similar solubilities. That is, completely water-soluble phosphate materials, those that are partially soluble, and even the very slowly soluble materials in time all change to compounds of equal solubility.

The final form and rapidity of change of these transformed phosphate compounds are governed by the soil conditions, kind of phosphate material applied and rates of application.

Highly-soluble phosphates become less soluble and the slowly-soluble phosphates become more soluble under normal soil conditions. In time, equilibrium is reached and all the applied phosphates have the same availability, regardless of their initial solubility.

Studies have also shown that a highly water-soluble phosphate fertilizer has at the most only a temporary advantage, which is lost before crop maturity. Such findings are verified by the statements and data reported by many state agricultural workers.

Recently, claims have been made for 100% water-soluble phosphatic fertilizer, based on the belief that

these carriers can penetrate more quickly and deeply into the soil and remain available longer.

Testing and experimental work has been conducted in 18 states of the central section of the U.S. These states occupy the area where a major portion of the discussions on water-soluble phosphate fertilizer are most vigorous. Fortunately, there are numerous tests and experiments in these states to permit definite conclusions.

These results, and the comments of research workers involved, are recorded in the succeeding paragraphs. The states from which these reports emanate are: Alabama, Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Ohio, Oklahoma, Tennessee, Texas, and Wisconsin.

Alabama

"... In general, more water soluble phosphorus is needed for short-season crops than for long-season crops. Plants often show a response in favor of water-soluble phosphorus during early stages of growth but differences may not be evident in final yields. Published data indicate that water solubility is more important on soils that are extremely deficient in phosphorus. The importance of water solubility decreases with increasing rate of application. Observation also indicates that water solubility is more important under adverse weather conditions. Differences due to water solubility are more likely to appear when the fertilizer is band placed than when broadcast. In view of the above factors, it may be almost impossible to obtain sufficient data to make specific recommendations. However, I believe we have enough data to show that some of the phosphorus should be in a water-soluble form for most crops under a wide range of conditions. On the

other hand, it is doubtful if there is any advantage in having more than 50 to 60 percent of the phosphorus in the water soluble form even for responsive crops on soils very deficient in phosphorus." Personal communication from Dr. L. E. Ensinger, Alabama Polytechnic Institute. July 3, 1957. April 8, 1959.

Arkansas

"In general it has been difficult to show any difference in phosphate response for materials above 60% water solubility; except in certain instances where conditions have been just right for favoring the soluble forms. A partial explanation may be found in the close relationship between the nitrogen and phosphate chemistry of the plant, of the two elements and their forms, and their utilization by the plant.

"It is our belief that incorporation of any form of phosphate in the soil will result in a reaction with the soil establishing an equilibrium of some kind. The equilibrium thus formed, while perhaps varying chemically, is not critical in so far as the plant is concerned and thus all materials may reach a condition of 'equal availability.' The time required for this condition to become established may undoubtedly vary with the soil, conditions, and material source." Sixth Annual Arkansas Fertilizer School, November 16, 1956.

Illinois

"Based on experimental work conducted by the U.S. Department of Agriculture and the Iowa and Michigan Agricultural Experiment Stations, we recommend that phosphate fertilizers used in band application contain 50 percent or more of the P_2O_5 in a water-soluble form." Agronomy Fact Sheet No. 48.

Indiana

"Indiana has not made extensive tests on the comparison of phosphate ferti-

lizers with varying water solubilities. Our opinion on this question is based on the work done here on nutrient uptake from fertilizer bands and by several states in the North Central Region. Conclusions based on this work are as follows: (1) Water solubility is most important when fertilizer is applied in concentrated bands such as row fertilization of corn and small grains. Water solubility has no advantages when fertilizers are applied broadcast. (2) Phosphorus utilization from fertilizer bands is proportional to the percentage water solubility. The non-water soluble portion is much less available to corn and wheat plants; however, it has as much or more residual effect." Personal communication from Dr. J. B. Peterson, Aug. 9, 1957.

Iowa

"Field experiments comparing phosphate fertilizers varying in water solubility from 2 to 100% have been carried on in Iowa since 1950. The experiments were conducted on both acid and alkaline soil and the plots in each experiment were well replicated. The data from 25 field experiments involving hill fertilizers for corn showed that, in general, the greater the water solubility of the fertilizer phosphorus the greater the increases in yield. The yields increased rapidly with increasing water solubility up to 55% of the total P_2O_5 . Fertilizers having 55% of the total P_2O_5 in water soluble form, however, produced about 90% of the maximum increases in yield. Additional increases in yield from water solubilities above 80% were small and inconsistent.

"On the basis of these data it is concluded that corn fertilizer used in the hill or row should contain at least 50% of its phosphorus in water soluble form. With applications of phosphorus fertilizers plowed under for corn, advantages for the materials of high water solubility were less than where they were used in the hill. The data indicate that 20 to 30% water solubility may be enough where the fertilizer is plowed under the corn. We have less information on oats, but what we have would indicate that especially for use on calcareous soils, the water solubility of the P_2O_5 should be at least as high as for hill application for corn (i.e. 50%). This applies to both drilling and broadcasting.

"On acid soils, the data indicate that the more highly water soluble materials lost some of their advantage, but were never inferior." Summation of reports and papers at fertilizer manufacturers' conference, January and November, 1956; and annual meeting of the Middle West Soil Improvement Committee in February, 1955; Agricultural Chemicals, Volume 10, March, 1955; Capper's Farmer in February, 1957; "Fertilizer Innovations and Resource Use," Chapter 3, Iowa State College Press, 1957; An Evaluation of Phosphorus Fertilizers Varying in Water Solubility: I Hill Application for Corn, John R. Webb and John T. Pesek, Soil Ser. Soc. of America Proc. P. 533-538, Vol. 22, No. 6, Nov.-Dec., 1958 and personal communication from Dr. W. H. Pierre, Iowa State College, April 17, 1959.

Kansas

"The combined results from the measurement of plant growth response and from the measurement of chemically 'available' phosphorus contained in the soil after harvest suggest that a highly soluble carrier of phosphorus such as mono-ammonium phosphate offers no advantage when compared to an appreciably less soluble carrier such as superphosphate. Actually there was evidence that very soluble sources of phosphorus



FERTILIZER SHORT COURSES PLANNED—A group on the agronomy committee at the annual short course planning session at Abraham Baldwin Agricultural College in Tifton, Ga., is shown working out plans for two short courses relating to soils and fertilizers. They are: (seated) S. A. Parham, agronomist at the Georgia Coastal Plain Experiment Station; standing, left to right, Jim Bergeaux, agronomist-fertilizer, extension service, college of agriculture; Tony Dozier of Macon, vice president of Central Georgia Fertilizer Co., and president of the Georgia Plant Food Educational Society, and R. L. Carter, soil scientist at Coastal Plain Experiment Station. The agronomy committee planned the two fertilizer courses, one entitled "Fertilizers and Soils" to be held in December, and another on "Fertilizer Placement" scheduled for January, 1960. The committee, which was headed by Mr. Parham felt that more interest is needed in fertilizer placement due to the fact that research is disclosing the importance in placement of the fertilizer in various crops for best production.

may result in the more rapid and more complete fixation into insoluble forms on soils containing an excess of CaCO_3 ." Influence of Free Calcium Carbonate in Soils Upon Availability of Various Phosphatic Fertilizers. Compilation of experimental work reported at the Sixth Annual Phosphorus Conference of the North Central Region, Dec. 3-4, 1954 (Ames, Iowa). April 15, 1959.

Kentucky

"Although differences in the early growth of grain crops have been correlated with the water-solubility of the phosphorus, final yields have not been significantly different in Kentucky. Under average conditions, there appears to be little need for having more than 10 to 20% of the available phosphorus in water-soluble form." Leaflet 114-A University of Kentucky February, 1958, also Soil Science Society Proceedings Vol. 20, No. 4, P. 551. April, 1959.

Louisiana

"We have tried the placement in bands of superphosphate, treble superphosphate and ammonium phosphate. While we have measured some differences in crop responses, the differences are not great enough to draw conclusions until the studies have been conducted for longer periods of time and in more extensive soil areas." Personal communication from Dr. M. B. Sturgis, Louisiana State University, Aug. 23, 1957.

Michigan

"The ability of a given fertilizer to supply phosphorus to plants is dependent on its water solubility, particle size, and placement as well as on certain soil properties . . ."

"Results of greenhouse experiments show that when pulverant fertilizer was well mixed with soil, the percentage of the phosphorus in a water-soluble state had little effect in controlling absorption of fertilizer phosphorus by plants. Likewise, dry-matter production was quite similar over a wide range of phosphate water solubility."

"It was noted in pot tests that if granular fertilizer was well mixed with soil, the uptake of fertilizer phosphorus was found to be positively related to the percent of the phosphorus in the fertilizer soluble in water. Dry-matter production of several crops was closely correlated with fertilizer phosphorus absorption. To be effective, granular material should contain from 40 to 60 percent of its phosphorus soluble in water." Influence of Particle Size, Water Solubility, and Placement of Fertilizers on the Nutrient Value of Phosphorus in Mixed Fertilizers. Soil Science Volume 82, PP. 465-475, 1956.

Minnesota

"Broadly speaking, water solubility of a fertilizer is less important on acid soils than on alkaline ones. Water solubility is not a factor with long season crops and efficient users of phosphate (like most legumes) grown on acid and neutral soils with moderate or greater amounts of available soil phosphorus, and when fertilizer applications are relatively large. In those situations on acid and neutral soils with moderate or greater amounts of available soil phosphorus, and when fertilizer applications are relatively large. In those situations on acid soils which are low to very low in available phosphorus and only small amounts of fertilizer are used, such as in a starter for corn, better response has been obtained from water soluble fertilizers."

"On alkaline soils experiments with tracer phosphorus in field and greenhouse have shown greater absorption of phosphorus from water-soluble fertilizers. In not all instances, however, has increased absorption been accompanied by increased yields, particularly in field experiments. Even on alkaline soils water solubility is not important unless the content of water-soluble phosphate falls below approximately 50 percent." The Solubility of Fertilizer Phosphates. Soil Series No. 47, University of Minnesota, Institute of Agriculture, Department of Soils, Agricultural Experiment Station,

Mississippi

"It is somewhat difficult to formulate a general statement regarding the minimum amount of water soluble phosphorus that is needed in fertilizers because phosphate carriers are so different in their nature and solubility in water. About the best statement we can make is as follows: Based on results obtained in Mississippi, and elsewhere; fertilizers in which 50% or more of the available phosphorus as determined by the official method is soluble in water are as effective, on the average, for crop production under Mississippi conditions as those containing 100% water-soluble phosphorus. With certain restrictions as to crops, soil characteristics, granule (particle) size of the fertilizer, nature of the phosphate, method of application, and perhaps other factors, some fertilizers containing less than 50% water-soluble phosphorus are as effective as those containing more than 50% water-soluble phosphorus." Personal communication from Prof. James D. Lancaster, Mississippi State College, July 29, 1957. Journal Assoc. Official Agr. Chem. 25:498-509. Miss. Agr. Exp. Sta. Bul. 506:1-34.

Missouri

"Ten years of field results with winter barley and wheat on both limed and unlimed land has shown no significant difference in yield between water-soluble and citrate soluble phosphates. With cotton and corn, starter fertilizer containing a high percentage of water soluble phosphorus has increased the rate of growth of young plants. These differences seldom carry over and are not evident in harvested yields. Starter fertilizer alone on corn has frequently reduced yields."

"Where ample soil fertility is provided to build up nutrient levels and eliminate phosphorus as a limiting element for plant growth the amount of water-soluble phosphorus in starter fertilizers has been of minor importance. Analysis for water soluble phosphates of 55 of the principal grades of fertilizers sold by eleven companies in Missouri last year indicate that very little fertilizer was offered for sale that contained less than 40% of water soluble phosphates." Soil fertility and Small Grain Production, Missouri Bull. 657, and personal communication from G. E. Smith April, 1959.

Nebraska

"Since much of the active transport of nutrients to the plant root is through the soil solution, which is essentially water, obviously the more water soluble the phosphate in the soil the more available it is to the plant. This has been found the case with various crops and soil conditions in Nebraska. For example, studies have demonstrated that corn uses fertilizer phosphate more and more effectively as water solubility increases up to about 70%, above which level there is no further increase in use. The magnitude of increase measured was an approximate doubling of the utilization between 20 to 70% water solubility."

"High initial availability of phosphate is especially important for annual crops like small grains and corn which make their entire growth in a few months time. It is much less significant in the case of biennial and perennial legumes which forage deeper into the soil for nutrients and which are capable of extracting phosphate of lower solubility than most annual non-legumes. Thus the cash grain farmer may generally expect greatest returns per unit of phosphate from materials of high water solubility. The livestock farmer, on the other hand, who grows substantial amounts of forage crops may derive equally good results from products of substantially lower water solubility."

Crop, soil, rate of fertilizer application, and placement method all influence the efficiency of fertilizer phosphorus use. The phosphate fertilizer carrier of high water solubility will demonstrate a superiority over other products on many soils. Especially is this true on alkaline soils, when the fertilizer is applied in a small annual application, by the most efficient placement method, to a crop highly responsive to phosphorus fertilizer. If, however, placement is ineffective, rate exceeds that needed for effective

nutrition of the crop, and the crop does not meet the above specifications, water solubility will not be closely related to efficient phosphorus utilization." Annual Report of Commercial Fertilizers for Nebraska June 30, 1957. Prof. R. A. Olson.

Ohio

"We have not conducted any test with water solubility of phosphorus sources. The work of Iowa and Michigan serves as our guide for the region." Personal communication with Ohio Agricultural Experiment Station, June 17, 1957.

Oklahoma

"We have a commercially sponsored project underway at this station evaluating the effect of water-soluble phosphate fertilizers. The project is in its infancy and the results are not yet conclusive. We are trying to ascertain if a high degree of water solubility is advantageous under low soil moisture conditions."

"Our current thinking is that the water solubility of phosphate fertilizers is not as important as the ability of the fertilizer material to maintain equilibrium with soil factors favorable for plant growth. The ability of a fertilizer material to maintain a level of available soluble phosphorus sufficient for normal plant requirements seems to be more important than the over-all solubility of the material, although, of course, it may be related to it." Personal communication from Dr. M. D. Thorne, Head, Agronomy Department, Oklahoma State University April 10, 1959.

Tennessee

"The University of Tennessee agricultural experiment station has conducted a number of field experiments on crop responses to fertilizer mixtures in which the phosphorus varied in degree of water solubility. The results of these experiments have not yet been published. However, the data indicates that a high degree of water solubility is not important on crops such as small grains for grain, cotton, and corn as long as the phosphorus is 'available' as determined by conventional methods." Personal communication from Prof. O. H. Long, the University of Tennessee, July 30, 1957.

Texas

"Superphosphate, diammonium phosphate, monocalcium phosphate, dicalcium phosphate, tricalcium phosphate and Florida rock phosphate were mixed with Austin clay, Houston Black clay, Hunt clay, Bonham loam and Nacogdoches sandy clay loam in sufficient quantity to add 100 ppm. of total phosphorus . . ."

"The amount of phosphorus extractable decreased rapidly with time of contact, especially in the first five days. This difference in rate of fixation was most pronounced in the case of the more soluble sources. After the first five days the more soluble sources behaved more like dicalcium phosphate. Tricalcium phosphate and Florida rock phosphate provided considerably less extractable phosphorus than the other four sources."

"The rate and amount of fixation varied with soil type. It was greatest and most rapid in the acid Nacogdoches sandy clay loam and least in the calcareous Austin and Houston Black clays. The Hunt clay and the Bonham loam were intermediate between these extremes."

"The data suggest very little difference among the more soluble sources of phosphorus. It would seem desirable to make frequent small applications in order to maintain a good supply of extractable (available or water soluble) phosphorus in these soils." Effect of Time, Soil Type and Source of Phosphorus on the Extractability of Applied Phosphorus. Proceedings of Association of Southern Agricultural Workers, 1957.

Wisconsin

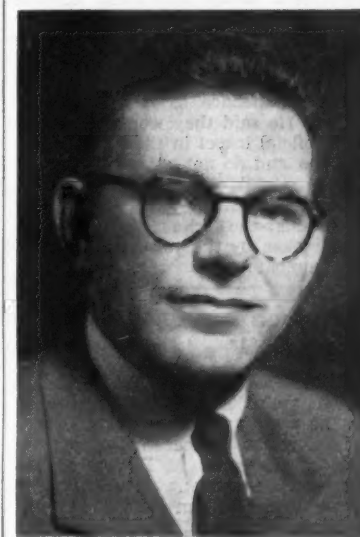
"Studies with the orthophosphate materials (ammonium phosphate, superphosphate and concentrated superphosphate) indicate a need for substantial amounts of water soluble phosphorus in fertilizers, especially when used for row application. A large number of experiments show that increasing the water solubility of the fertilizer phosphorus from 0 to 50% gave marked increases in crop yields. However,

small or no significant yield increases were obtained by increasing the water solubility above this point. For broadcast applications, a lower content of water soluble phosphorus gave satisfactory results."

"Fertilizer materials blended from any of the above orthophosphate materials would be satisfactory. However, the water solubility of the phosphorus from the superphosphate materials may be changed substantially by ammoniation in the manufacturing process. Fertilizers made from ammonium phosphates and of course liquid fertilizers have high water solubilities ranging from 80-100%. Mixtures made from the ammoniation of concentrated superphosphate may range from 50 to 70% and ammoniation of ordinary superphosphate produces materials ranging from 20 to 70% water solubility. However, the more commonly used row fertilizer materials made from ammoniated superphosphate seldom fall below 50% water solubility." "What About Water Solubility of Phosphate?" January, 1959. University of Wisconsin Lime and Fertilizer Dealers Program.

The results, comments, suggestions and recommendations of the many agricultural, research, and extension workers in these eighteen (18) states indicate that they have been thinking and working on the problems created by the high water soluble phosphorus fertilizer controversy. Surprisingly, these various state workers are very much in agreement in their comments, although they arrive at these conclusions by many different ways.

They report that a 100% water-soluble phosphorus fertilizer generally increased early growth. Any increased early effect usually disappears before maturity. These agronomists reported very little difference between the yields when the completely water-soluble, and available phosphorus or ammoniated superphosphate carriers were compared. The average minimum amount of desirable water-soluble phosphorus, expressed by these states, was 40%. The maximum degree of such desirable solubility was 80%. The majority of the states indicated that a 40 to 60% water-soluble phosphate fertilizer was satisfactory for most crops and soil conditions.



C. C. Alexander

ENTOMOLOGIST DIES — Clair C. Alexander, 46, Gelgy Chemical Corp. entomologist, was killed recently in the crash of a commercial airliner near Baltimore, Md., while on a company business trip. Mr. Alexander, well known throughout the agricultural chemical industry, had been with Gelgy for 15 years. He was a native of Ohio and attended Purdue University, Lafayette, Ind., and Ohio State University, Columbus. He held agricultural degrees from both schools. Survivors include his widow, Isabelle, and daughters Dianne, 13 and Patricia, 7, all of Tarrytown, N.Y., where the Alexanders made their home.

BARGAIN FOR FARMERS

Fertilizers and Pesticides Hold Favorable Price Levels

WASHINGTON—That happy fact of life for farmers—that fertilizers and pesticides are their best buys—has been underscored again by the U.S. Department of Agriculture in its Farm Cost Situation issued last week.

Prices paid by farmers for fertilizer this spring are slightly below those of last fall and a year ago, and are only 5½% above the 1947-49 average, USDA noted. The prices are about 5% below the all-time high of September, 1954.

Prices of most nitrogen materials and of muriate of potash are lower than a year ago while phosphate prices are about the same.

USDA also reported that prices paid by growers for most finished dust and spray materials this season are expected to be about the same as last year. Manufacturers' prices of pesticidal chemicals averaged slightly lower than a year ago. Prices of parathion and methyl parathion are considerably lower.

Competition of newer materials and adjustments of inventories are largely responsible for somewhat lowered prices of calcium arsenate and cube (rotenone) root, USDA said. During the winter, DDT quotations rose slightly because of heavy export demand resulting from the world program to eradicate malaria. Prices of

copper sulfate have risen considerably in recent months.

According to the Farm Cost Situation, use of fertilizer this spring appears substantially greater than it was a year ago. Fragmentary reports indicate that sales in some southern states are running from 10% to 20% above those of last year, with larger increases in some areas. Farmers in most areas appear to be buying fertilizer earlier this spring than a year ago, USDA said.

The report also noted that demand for pesticides has been more active this year than in 1958.

Insects Troublesome To Mid South Farmers

MEMPHIS—General rains in the Mid South have proved the worth of chemical weed control, according to the Mississippi Extension Service. Extension officials say that treated fields are clean while untreated fields are requiring hoe-labor.

Moisture has brought most of the planted crops to a stand but farmers throughout the area are having trouble with insects. In Mississippi, C. B. Betterton, Jr., Chickasaw County agent, says that 85% of the cotton in that county is up to stand but thrips are causing some damage. Thrips also are causing trouble in Madison and Holmes counties, and farmers are turning to chemical control methods.

H. W. Luck, assistant agronomist at Jackson, Tenn., says he has received reports of insect damage to pasture and hay crops and that cotton has suffered somewhat from flea beetle and cutworm attacks.

Arkansas Extension Service representatives say that the week's rains should sprout late planted cotton. Most of the crop is already up and chopping is under way in many areas.

California Air Group Opposes Taxing Measure

FRESNO, CAL.—The Agricultural Aircraft Association of California has expressed opposition to a proposed bill in the California State Legislature which would require an annual state registration of aircraft and an "in lieu" tax. According to the measure, the State Department of Motor Vehicles would register the aircraft and collect the annual registration fees. The tax would be collected by the California Aeronautics Commission.

The reasons for the objections, according to Wanda Branstetter, AAA executive secretary, are that the measure would duplicate the registration fee required by the Federal Aviation Agency, and the collection of the tax "in lieu" of the present county personal property tax on aircraft is unnecessary since the money is turned over to the county general fund where it goes at the present time anyway.

"The legislation would only serve to give a state agency a collection job which would cost the state government money," according to Mrs. Branstetter, and would "materially increase the cost of agricultural aircraft services in California."

The association has also expressed opposition to another bill just introduced into the Assembly. This bill, known as AB 2513, would transfer the control and regulation of all ground and air pest control operations from the Department of Agriculture to an "Agricultural Pest Control Board," composed of five members appointed by the Governor.

According to the AAA, there are "no problems in the industry which indicate the need for such legislation."



BAUGHMAN MANUFACTURING CO. has purchased the former International Shoe Co. plant in Jerseyville, Ill. George O. Hofstetter, Baughman general manager, stated that the purchase was made necessary by an accelerated volume of orders for the company's products. For the past month the present Baughman plant has been operating at full capacity with extra shifts required in order to fill orders. Mr. Hofstetter said that the newly-purchased plant will be modernized and ready for occupancy soon. Plans call for fabrication of parts and smaller products assembly in the new plant while assembly lines for larger bodies will be maintained in the original Baughman plant.

LEGISLATIVE EDITORIAL

(Continued from page 1)

an amendment would be manifestly against the best interests of the plant food industry in that state and could well harm the good name of the trade over a much wider area.

The bill could bring about the complete abandonment of present regulatory safeguards, and would place a serious roadblock in the way of progress in the trade, so far as Illinois is concerned.

A number of other states have provided in their laws for blenders to register and guarantee their products, and some highly reputable fertilizer manufacturers have been able to work out techniques whereby grades and guarantees can be met in blended products.

In a statement to Croplife following his appearance before the Illinois House Agriculture Committee, Zenas H. Beers, Midwest regional director of the National Plant Food Institute, had this to say:

"House Bill 1355, introduced into the Illinois general assembly has serious implications for the fertilizer industry. Its passage would relax present protection to farm fertilizer buyers and open the door to misrepresentation, adulteration and fraud.

"It would seriously weaken rather than strengthen the present Illinois fertilizer law by removing a substantial portion of the plant food sold in the state from regulatory control.

"The bill provides for a definition of a blender that would require him only to guarantee the ingredients which he puts into the blended batch, and not the common or blended batch. This guarantee would be meaningless, we believe, for there would be no way of checking the ingredients once they were blended.

"We think House Bill 1355 is bad legislation and should be defeated. The fertilizer industry opposes it for these reasons:

1. "An Illinois farmer would have no way of checking the blended batch to be sure that he was getting what he paid for. For farmers it would be 'buyer beware.'
2. "The chances for error and fraud are great. For example some materials worth \$70 a ton or more cannot be told, without analysis, from those worth only \$40 a ton, so that substitution of the cheaper materials would be very easy.

3. "Most farmers do not ever see the blended fertilizers that are spread on their fields. Therefore the chance for substitution and fraud is very great.

4. "Cheating of \$4 to \$5 a ton could not easily be detected without carefully controlled field plots and even those would be subject to question in courts. On 3,000 tons which many blenders produce in a year, \$4 or \$5 ton would amount to \$12,000 to \$15,000 a year.

5. "There is a great chance for error and fraud because most of the fertilizer is delivered in just a few weeks during the spring when plants run round the clock and great pressure is put to deliver as much fertilizer as possible in as short a time as possible.

6. "If this bill becomes law, we believe that unscrupulous people will be attracted to the fertilizer business. When fraud is so easy and detection so difficult and inspection so inadequate, 'fast buck artists' are easily attracted.

7. "The statement of the contents in the blended batch would be meaningless, for there would be no way of checking.

8. "The wording of the bill is ambiguous so there is question as to whether the blended fertilizer would be 'commercial fertilizer' and thus be subject to the 20% minimum plant food content of other fertilizers.

9. "Under this bill, where there is no restriction on the minimum, Illinois could well become the 'dumping ground' for low value, inferior products, for once they were included in a blend, there would be no way of detecting them.

10. "H1355, enacted to law, could lead to a total breakdown of the whole fertilizer control system which has been built up through years of experience and necessity for the protection of the farmer buyer.

11. "All fertilizer manufacturers could register as blenders and sell most of the products on the basis of the ingredients with nothing but the raw materials subject to inspection and analysis. Surely the great agricultural state of Illinois does not want to establish such a precedent.

12. "This bill would make it possible for blenders to say, 'our fertilizers are just the same as those which are guaranteed, but the law will not permit us to say so because it is difficult to check.'

"Furthermore, H1355 is not needed, for it is possible to blend fertilizers, guarantee the analysis and have the blended batches meet the guarantee."

FIRE ANT

(Continued from page 1)

declared that the cure is worse than the disease. He said the program has been a gigantic boondoggle the last 18 months, costing \$8 million.

Mr. Peters said that since the government is using chemicals 15 to 20 times stronger than DDT, the toll of wildlife is considerable. He said it was impossible for any organism to cross the treated paths without contacting a number of the granules of poison. Within two or three days of treatment many birds and animals have been found dead, and even after one year freshly killed victims can be seen, he said.

Mr. Peters denied that fire ants are as much menace as has been publicized. He said they were considered a beneficial insect in their native Argentina and do not attack crops, domestic animals or livestock, and therefore the National Audubon Society maintains the eradication program undertaken by the state and national governments is unnecessary.

Increased Rapeseed Acreage Prompts Weed Protection

BRANDON, MAN.—Sowing of approximately 500,000 acres to rapeseed in the prairie provinces has warranted efforts to protect this crop from weeds, states D. A. Brown of the Canada Department of Agriculture Experimental Farm here.

Because rapeseed is a close relative of common mustard it is sensitive to the hormone group of selective herbicides. Certain herbicides have been worked into the soil prior to seeding the crop and with good effect but this method is expensive and entails too much tillage to be practical.

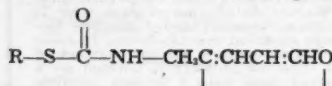
Herbicides, including Eptam (EPTC) and Trichloroacetic acid (TCA), have been applied in water sprays just before the crop plants emerge, with insignificant injury to the rapeseed and good control of all annual grassy weeds. These two chemicals, with the addition of Randox (CDAA) destroy green foxtail when applied to the standing crop just before the bud stage is reached, and Randox gave fair control of stinkweed and pigweed.

PATENTS and TRADEMARKS

2,887,872

Lower Alkyl Esters of N-furfurylthiocarbamic Acid as Compositions and Herbicides. Patent issued May 19, 1959, to Harry Tilles, El Cerrito, and Joe Antognini, Mountain View, Cal., assignors to Stauffer Chemical Co.

The method of combatting weeds comprising applying a phytotoxic amount to the soil of the compound



where R is a lower alkyl group.

2,887,871

Method of Killing Undesired Plants. Patent issued May 19, 1959, to George E. Bennett and William W. Lee, Dayton, Ohio, assignors to Monsanto Chemical Co., St. Louis, Mo. A method of killing undesired plants which comprises applying thereto a lethal dose of a monomeric silyl acetylene in which three hydrocarbon radicals other than the acetylene radical are attached to the silicon atom, the said hydrocarbon radicals being selected from the group consisting of alkyl radicals of 1 to 6 carbon atoms, phenyl, and alkylphenyl radicals in which alkyl can be up to 4 carbon atoms.

Industry Trade Marks

The following trade marks were published in the Official Gazette of the U.S. Patent Office in compliance with section 12 (a) of the Trademark Act of 1946. Notice of opposition under section 13 may be filed within 30 days of publication in the Gazette. (See Rules 20.1 to 20.5.) As provided by Section 31 of the act, a fee of \$25 must accompany each notice of opposition.

Simazin, in capital letters, for herbicides. Filed Sept. 27, 1956, by Geigy Chemical Corp., Ardsley, N.Y. First use March 20, 1956.

Etazin, in capital letters, for herbicides. Filed Oct. 18, 1957, by Geigy Chemical Corp., Ardsley, N.Y. First use Sept. 24, 1957.

Trietazine, in capital letters, for herbicides. Filed March 20, 1958, by Geigy Chemical Corp., Ardsley, N.Y. First use March 4, 1958.

Fluorex, in capital letters, for fungicides and insecticides. Filed Oct. 21, 1958, by American Fluoride Corp., New York. First use Jan. 1, 1926.

Melprex, in capital letters, for fun-

KHAPRA BEETLE

(Continued from page 1)

ed sites are fumigated before they are allowed to move.

Agricultural Research Service workers first found the beetles in an El Paso feed mill late in February during a routine inspection. Close inspection of other nearby mills and warehouses was started immediately.

Khapra beetles were first found in the U.S. (as well as the western hemisphere) in 1953. Since then, more than 600 infested sites, involving 150 million cubic feet of grain storage space, have been treated in Arizona, California, east-central New Mexico, northwestern Mexico and at Guadalajara, Jalisco, in the interior of Mexico.

Khapra beetles have been eradicated from the six known sites in east-central New Mexico, and favorable progress is being made in eliminating infestations in Arizona, California, and Mexico. Surveys for khapra beetle have been conducted in important grain storage facilities in other states, but none have been found.

gicide. Filed Oct. 22, 1958, by American Cyanamid Co., New York. First use Sept. 10, 1958.

Plantabbs, in capital letters, for fertilizer in tablet, powder and liquid form. Filed Sept. 5, 1958, by Plantabbs Corp., Baltimore, Md. First use April 15, 1925.

Chlorazin, in capital letters, for herbicides. Filed Sept. 27, 1956, by Geigy Chemical Corp., Ardsley, N.Y. First use Sept. 20, 1956.

Design, hand-drawn words, Colonial-42 and drawing of rat, for rodenticides. Filed June 24, 1958, by Colonial

Products, Inc., West Palm Beach, Fla. First use Oct. 25, 1950.

Funga-Lawn, in hand-drawn letters, for chemical fungicide. Filed July 28, 1958, by Mock Seed Co., Pittsburgh, Pa. First use May 1, 1958.

Design, drawing of odd-shaped house with the words Mock's Super-turf imprinted on the house and the words Funga-Lawn Lawn Fungicide appearing below, for chemical fungicide. Filed July 28, 1958, by Mock Seed Co., Pittsburgh, Pa. First use May 1, 1958.

Atrazine, in capital letters, for herbicides. Filed Oct. 2, 1958, by Geigy Chemical Corp., Ardsley, N.Y. First use Aug. 6, 1958.

NEW EDITOR

CLEMONS, S.C.—J. B. Copeland, assistant agricultural editor at Clemson College for the past 5 years, has been named agricultural editor succeeding S. C. Stribling who retired June 1.

Bureau of Census Reports Inorganic Chemical Production for March

WASHINGTON — Production of synthetic anhydrous ammonia during March amounted to 384,128 short tons, reported the Bureau of the Census, U.S. Department of Commerce.

Other production figures of inorganic chemicals which were reported include: ammonium nitrate solution, 249,724 tons; nitric acid, 267,215 tons; phosphoric acid, 166,898 tons, and sulfuric acid, 1,579,878 tons.

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Crop-Use Patterns of Fertilizer in the United States

by

J. R. ADAMS L. B. NELSON D. B. IBACH
U.S. DEPARTMENT OF AGRICULTURE

This significant report was compiled by the U.S. Department of Agriculture after thorough studies of fertilizer use in the United States. Crop-Use Patterns covers questions which, until now, have not been adequately answered. Crop-Use Patterns is based on information gathered from every fifth farm surveyed in the most recent U.S. Census . . . providing a broad base of national information.

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A WEEKLY NEWSPAPER FOR THE FARM CHEMICAL INDUSTRY

The regional circulation of this issue is concentrated in the Western states.

MORE "SCARE" STUFF . . .

Spray Programs Hit in Article

IN THE MIDST of rather sweet music emanating from the pesticide trade in general, concerning business this season, are heard some sour notes in the otherwise tuneful symphony. Pesticide critics and alarmists have just had a bonanza in reaching a large audience through an article appearing in the June Reader's Digest under the title of "Backfire in the War Against Insects."

This article, authored by Robert S. Strother who is not otherwise identified, trots out just about all of the accusations, innuendos and unproved assumptions which have been heard elsewhere in years past. Attacking particularly the fire ant control program in a number of Southern states, the article presents numerous statements by people fiercely opposed to such programs, but offers not a single quotation from anyone with the opposite viewpoint.

If this article is meant to view "objectively" the controversial situation, we could make a number of suggestions on how author Strother could have found some viewpoints to balance off the content of his masterpiece. It appears that everyone he contacted for information was 100% opposed to the pesticide program, and the scientists he quotes are likewise dead set against it. One scientist is quoted as saying, "If this and other pest-eradication programs are carried out as now projected, we shall have been witnesses, within a single decade, to a greater extermination of animal life than in all the previous years of man's history on earth."

These are potent words to be hurled at an already-jittery public through the medium of a widely-circulated publication. Apparently calculated to work on the sympathies of bird lovers, wildlife enthusiasts, and cranks who suspect pesticides of causing all types of human ailments, the impact of this article could well be noticeable to the trade.

Despite the impression that "everyone" in the fire ant area is utterly opposed to the eradication program, there are still many voices heard on the positive side.

A newspaper editorial appearing in the Conway (S.C.) "Field" during the height of the fire ant furore had some things to say which the "Digest" article might well have included to give its readers a broader picture of what others in the affected area are saying.

Said the editorial: "... In its present outcry against the joint federal-state eradication program against imported fire ants in nine southern states, the (Audubon) Society sounds a note a little too shrill for the ears of reason to tolerate. In demanding that the Department of Agriculture stop all such insect control efforts, a recent news release states: 'Insecticide hazards may well rank in seriousness of adverse effects with the dangers of radioactive fallout.'

"In view of the population checks conducted by the U.S. Public Health Service, which have failed to detect damage to public health from aerial pesticide spraying, the reports of other public authorities who found no serious or permanent adverse effects on wild life, such a statement can only be decried as a shameful effort to frighten those who are unfamiliar with the fire ant menace and with the care and safeguards employed in the spraying program. As such it is most unworthy of its sponsor.

"Reports from Mr. and Mrs. Tom Cater, Jr., bird-watchers of Warner Robins, Ga.—at the heart of the fire ant devastation—and who are respectively president and past president of the Middle Georgia Audubon Society, suggest that the voice that speaks (against the program) may not be the voice of Audubon-at-large.

"I am an engineer at Robins Air Force Base,"

said Mr. Cater in a recent radio interview, "and have been in a position to observe the use of chemicals for mainly white fringe beetle and other pests. We have spread these chemicals constantly for the past ten years, and I have observed that it has been done by aerial spray, by mechanical spray and also by burying chemicals in the ground. During this period we have, my wife and I have, constantly gone birding on the weekends and I have not observed any change in the bird population through these trips."

"In confirming her husband's report, Mrs. Cater noted that 'we have seen numbers of birds—such as the meadowlarks, robins, blackbirds of various kinds, killdeer—feeding on the ground and have noticed no decrease in their numbers.' She had not heard, she said, of any pets in the area suffering ill effects from the spray.

"It should be kept foremost in mind, however, that there is a war on in these nine states against an advancing enemy that has ravaged more than 20 million acres of fields and forests, killed newborn livestock (and certainly wild-life, too), and has killed and injured humans. If the Audubon Society can suggest a better way to fight it, all America, in and out of the combat zone, would be happy to urge it upon the authorities. But it is no time to surrender."

Dr. Herbert L. Stoddard, Sr., Thomasville, Ga., formerly director of the Cooperative Quail Study Assn. and a consultant for forestry and wildlife affairs for about 400,000 acres of privately-owned quail and game lands, was also on a radio interview not long ago to discuss the way fire ants attack and destroy quail.

"At hatching time when the eggs are cracked by the young emerging chicks, the fire ants enter the egg and actually eat up the little bird," he reported. "They also bother the nesting by bothering the female quail while she is incubating. They may bite her and that causes her to leave the nest and desert it."

Asked for an estimate as to the number of quail that are destroyed by fire ant, Mr. Stoddard said "We think that up to almost 50% of the nests might be destroyed by the fire ant." He added that "the best way to handle the matter is to completely eradicate the pest rather than to try and live with it."

In a previous discussion concerning use of DDT, Dr. Edward F. Knipling, USDA entomologist, observed that the general public is not fully aware of "our responsibility of helping to adequately feed and clothe people by controlling the pests that destroy agricultural products. I wonder if it is realized how many persons throughout the world would die, or suffer serious illness, if insecticides and repellents were not used to protect them from insect attack."

Against the alarmists' cry that the use of pesticides are a hazard to wildlife and to human health, Dr. Knipling's further comments seem particularly potent: "DDT has come under heavy fire from those who believe that this insecticide, for some purposes at least, constitutes too great a health menace to permit its use . . . This attack goes on despite DDT's fine record in protecting people throughout the world from disease-carrying insects . . . On the basis of discussions with several health authorities . . . I estimate that no less than five million lives have been saved; no less than 100 million illnesses prevented through the use of DDT for controlling malaria, typhus, dysentery and many other diseases."

(These words were spoken several years ago . . . the figures would be greatly expanded by this time.)

We hope that pesticide formulators and dealers in every community across the nation will rally to the need for calming down some of the wrought-up citizens victimized by this anti-pesticide propaganda.

It seems too bad that a publication of the stature of the "Digest" should present such a completely one-sided picture of the pesticide scene.



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CROPLIFE is a controlled circulation journal published weekly. Weekly distribution of each issue is made to the fertilizer manufacturers, pesticide formulators and basic chemical manufacturers. In addition, the dealer-distributor-farm adviser segment of the agricultural chemical industry is covered on a regional (crop-area) basis with a mailing schedule which covers consecutively, one each week, four geographic regions (Northeast, South, Midwest and West) of the U.S. with one of four regional dealer issues. To those not eligible for this controlled distribution Croplife subscription rate is \$5 for one year (\$8 a year outside the U.S.). Single copy price, 25¢.

LAWRENCE A. LONG

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MEETING

MEMOS



Aug. 12-13 — Northeast Fertilizer Safety School, Cornell University, Ithaca, N.Y.

Aug. 18-19—Midwest Fertilizer Safety School, National Safety Council Headquarters, Chicago, Ill.

Meeting Memos listed above are being listed in this department this week for the first time.

June 4—Executive committee meeting, fertilizer section, National Safety Council, Hotel Roanoke, Roanoke, Va.

June 9-10—Annual Convention of the Alabama Seedsmen Assn., Houston Hotel, Dothan, Ala.; Raymond Shreve, Andalusia, Ala., secretary.

June 9-10—Seventeenth Annual Convention of the Association of Southern Feed and Fertilizer Control Officials, Velda Rose Motel, Hot Springs, Ark.; Maurice Rowe, Virginia Department of Agriculture, 1122 State Office Bldg., Richmond 19, Va.

June 9-11—Pilot plant demonstration on recent developments in fertilizer production technology. Muscle Shoals laboratories, Sheffield, Ala.

June 11-13—87th annual meeting, Manufacturing Chemists' Assn., The Greenbrier, White Sulphur Springs, W.Va., John L. Gillis, vice president of Monsanto Chemical Co., program chairman.

June 14-17—North central branch, American Society of Agronomy, Kansas State University, Manhattan, Kansas.

June 14-17—National Plant Food Institute, Annual Convention, the Greenbrier, White Sulphur Springs, W. Va.

June 15—Northeast Industry Advisory Committee, The Greenbrier, White Sulphur Springs, W. Va.

June 15-18—Western Society of Soil Science, San Diego State College, San Diego, Cal.

June 17-19—Northeast Branch American Society of Agronomy, University of Delaware, Newark, Del.

June 23-25—Pacific Branch, Entomological Society of America, 43rd annual meeting, El Dorado Hotel, Sacramento, Cal. Dr. Leslie M. Smith, University of California, Davis, branch chairman.

June 27—Del-Mar-Va Peninsula Fertilizer Assn., Ocean City, Md.

June 29-30 Fertilizer Industry Conference, University of Illinois, Urbana, Ill.

June 29-30—Seventh Annual California Fertilizer Conference, University of California campus, Davis, Cal. J. H. Nelson and Earl R. Mog, co-chairmen.

July 1—Western Research and Education Committee, El Mirador Hotel, Sacramento, Cal.

July 7-9—Regional Fertilizer Conference, co-sponsored by the Pacific Northwest Plant Food Assn. and state colleges and universities in the area, Winthrop Hotel, Tacoma, Wash.

July 15-17—Southwestern Fertilizer & Grade Meeting, Galvez Hotel, Galveston, Texas.

July 29—Annual Kentucky Fertilizer Conference, Guignol Theater, University of Kentucky campus, Lexington, Ky.

July 31—Agronomy Field Day, University of California, Davis, Cal.

Aug. 3-7—Gordon Research Conference on biochemistry in agriculture, Kimball Union Academy, Meriden, N.H.

Aug. 18-19—Annual Alabama Fertilizer Conference, Alabama Polytechnic Institute, Auburn, Ala.

Aug. 18-22—Annual Convention of the Canadian Fertilizer Assn., Bigwin Inn, Lake of Bays, Ontario.

Aug. 26-28—Soil Conservation Society of America, 14th Annual Meeting, Rapid City, S.D.

Aug. 30-Sept. 3—American Institute of Biological Sciences annual meeting, Pennsylvania State University, University Park, Pa.

Sept. 24-25—Annual North-Eastern Fertilizer Conference, NPFI, Biltmore Hotel, New York, N.Y.

Sept. 30-Oct. 1—Fourth Southeastern Fertilizer Conference, Atlanta Biltmore Hotel, Atlanta, Ga.

Oct. 13-14—Western Agricultural Chemicals Assn., fall meeting, Villa Motel, San Mateo, Cal., C. O. Barnard, executive secretary.

Oct. 14-16—Pacific Northwest Plant Food Assn. Annual Convention, Chinook Hotel, Yakima, Wash.

Oct. 21-23—National Agricultural Chemicals Assn., 26th annual meeting, French Lick-Sheraton Hotel, French Lick, Ind., Lea S. Hitchner, executive secretary.

Oct. 27—Seventh Annual Grassland Farming Conference, Extension Service, Rutgers University Col-

lege of Agriculture, New Brunswick, N.J.

Nov. 4-6—Fertilizer Industry Round Table, Mayflower Hotel, Washington, D.C. Dr. Vincent Sauchelli, National Plant Food Institute, chairman.

Nov. 9-11—California Fertilizer Assn., 36th annual convention, Fairmont Hotel, San Francisco.

Nov. 16-20—National Aviation Trades Assn., 20th annual convention, New Orleans, La.

Dec. 7-10—Central Canada and North Central Weed Control Conferences, Royal Alexandra Hotel, Winnipeg, Manitoba, Can.

Dec. 9-11—International Crop Protection and Pest Control Exhibition, Seymour Hall, St. Marylebone, London, England.

Cotton Production Costs Can Be Reduced One Third With Fertilizer, NPFI Says

DALLAS, TEXAS—Production costs for cotton could be reduced by one-third if farmers would use as much fertilizer as recommended, according to one authority.

Dr. Russell Coleman, executive vice president of the National Plant Food Institute, says farmers in the 16-state Cotton Belt area are using only 60% as much fertilizer as needed.

In 1957, cotton farmers were using an average of 120 lb. per acre of plant nutrients. Dr. Coleman predicts that this will eventually rise to 200 lb. or more. Better varieties of cotton will also increase the demand for fertilizer because such plants can take better advantage of it.

Much improvement in fertilization has already been noted. Dr. Coleman says, in the Southwest where supplemental irrigation is practiced, it now takes less than 20¢ to produce a pound of lint cotton.

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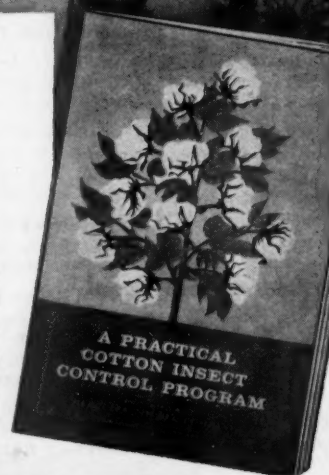
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